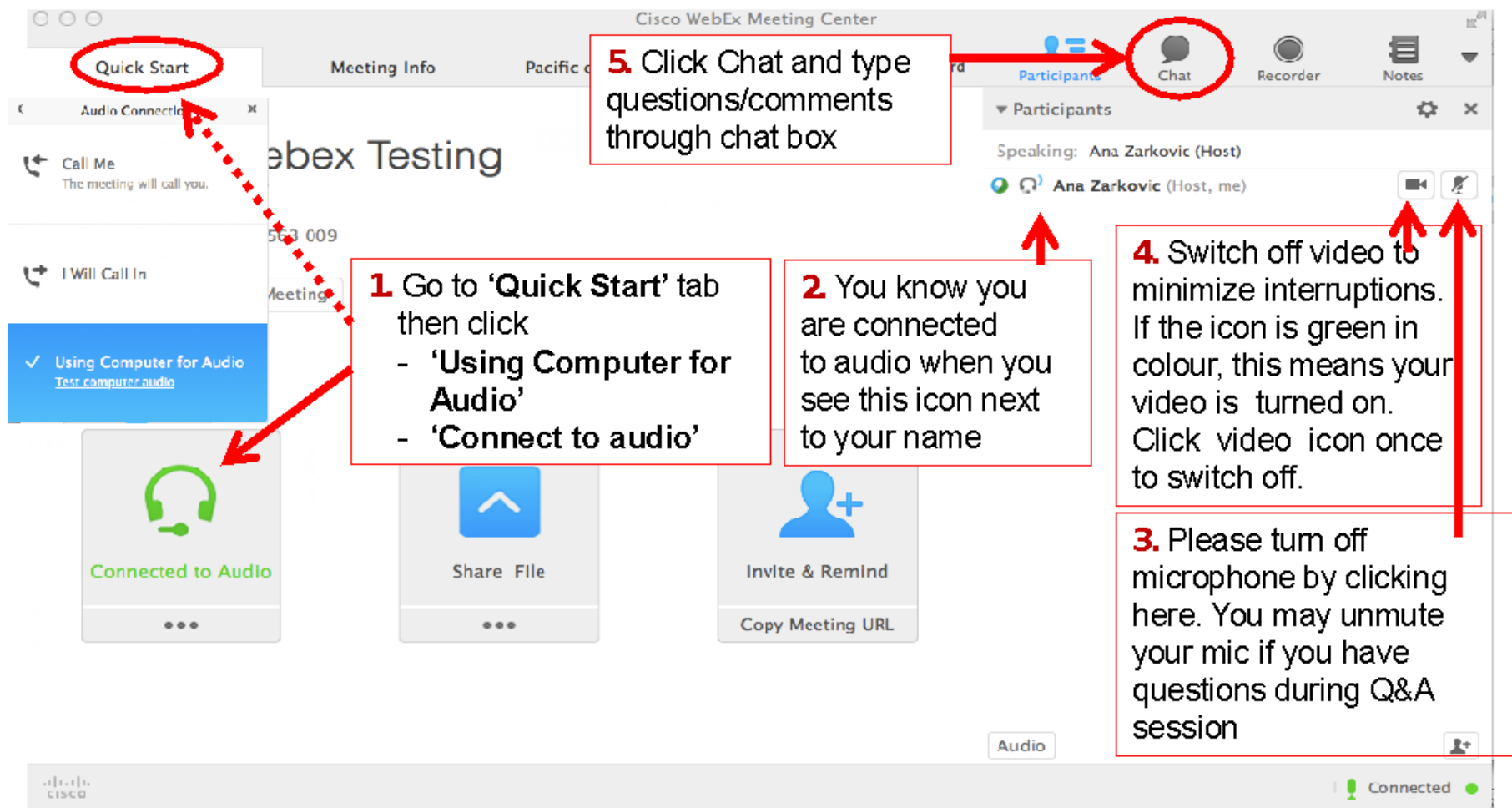


Reminders for a smooth webinar ...



The screenshot shows the Cisco WebEx Meeting Center interface. The 'Quick Start' tab is highlighted in the top left. A blue box indicates 'Using Computer for Audio' is selected. The 'Connected to Audio' status is shown with a green headset icon. The 'Share File' and 'Invite & Remind' buttons are visible. The 'Chat' button is circled in the top right. The 'Participants' list shows 'Ana Zarkovic (Host, me)' with a green video icon and a microphone icon. The 'Audio' button is at the bottom right.

1. Go to 'Quick Start' tab then click
 - 'Using Computer for Audio'
 - 'Connect to audio'
2. You know you are connected to audio when you see this icon next to your name
3. Please turn off microphone by clicking here. You may unmute your mic if you have questions during Q&A session
4. Switch off video to minimize interruptions. If the icon is green in colour, this means your video is turned on. Click video icon once to switch off.
5. Click Chat and type questions/comments through chat box

Good Webinar Behaviour

- Please keep your microphone on **mute**
- ***Questions during the presentation:***
 - If you have a question during the presentation or would like the presenter to clarify or expand – **please post your question and/or comment to Jessie Lucien in the Chat box.**
 - Questions will be compiled and answered in an email to all participants.
- ***Questions during the Q&A after each presentation***
 - 10 minutes are allocated for questions after each presentation.
 - Please use the “**Raise Hand**” **functionality** and the moderator will unmute you.

Speakers

Water and
Sanitation in Asia
Pacific



JAY MATTA is the IFRC WatSan coordinator for the Asia Pacific Zone. Jay has over 15 years experience as a Hydrogeologist and project manager in 9 countries.

Jay will be joining us from Kuala Lumpur.

Topic: Water Quality in Emergencies - introduction



LISA HIRSH is with **Aquagenx, LLC** and directs sales, marketing and daily operations. Her background is in building and executing sales and marketing programs for start-up and early stage companies. She has worked for Aquagenx since 2013.

Lisa will be joining us from North Carolina, USA..

Topic: Aquagenx Compartment Bag Test (CBT)



STUART BRYAN is a **Australian Red Cross** water and sanitation engineer who has been an advisor to Cruz Vermelha de Timor-Leste since 2011.

Stuart was deployed as a RDRT to assist with the recovery response assessment to the Kelantan floods in Malaysia and also Nepal for the immediate response to the recent earthquake.

Stuart will be joining us from Dili, Timor-Leste.

Topic: Case studies on use of CBT kits.

Why Water Quality

The quality of drinking-water is a powerful environmental determinant of health. Assurance of drinking-water safety is a foundation for the prevention and control of waterborne diseases.

Ref: http://www.who.int/water_sanitation_health/dwq/en/

Access to Improved Water

- 91 per cent of the global population now uses an improved drinking water source
- 2.6 billion people have gained access to an improved drinking water source since 1990
- In 2015, 663 million people still lack access to improved water sources (JMP Update 2015)



Safe v Improved

“Improved” Water ≠ “Safe” Water



Water: Contamination

How Can Water Sources be
Contaminated?

How Can Water at the HH
level be Contaminated?

Water: Contamination

Contaminated at source by:

- Leaking septic tanks and latrines
- Contaminated surface water run-off entering wells and springs
- Collecting water with unwashed hands and/or dirty containers
- Animals using the same source.
- Objects falling into the well.

Contaminated at HHs by:

- Transporting water from the source to the house in dirty water containers
- Storing water at home in open and/or dirty water containers.
- Handling water at home with dirty utensils or hands.

Water Supply

Quality: *'SPHERE' minimum Water Quality*

Water supply standard 2: Water quality

Water is palatable and of sufficient quality to be drunk and used for cooking and personal and domestic hygiene without causing risk to health.

Quality analysis for:

- 1. Site selection**
- 2. Water treatment process control**
- 3. Drinking**
 - at point of distribution
 - at household

Water: Quality (Immediate & Longer Term)

Sphere key indicators:

- A sanitary survey indicates a low risk of faecal contamination
- **No faecal coliforms per 100ml at the point of delivery**
- People drink water from a protected or treated source in preference to other readily available water sources
- For piped supplies or all at times of risk of a diarrhoea epidemic – free chlorine residual at the tap of 0.5mg/l with turbidity < 5 NTU (after 30 mins, 20 oC)
- No negative health effect is detected due to short-term use of water contaminated by chemical (including carry-over of treatment chemicals) or radiological sources, and assessment shows no significant probability of such an effect

Slide taken from WASH Cluster

Water: Quality – Recovery & Longer

Microbiological:

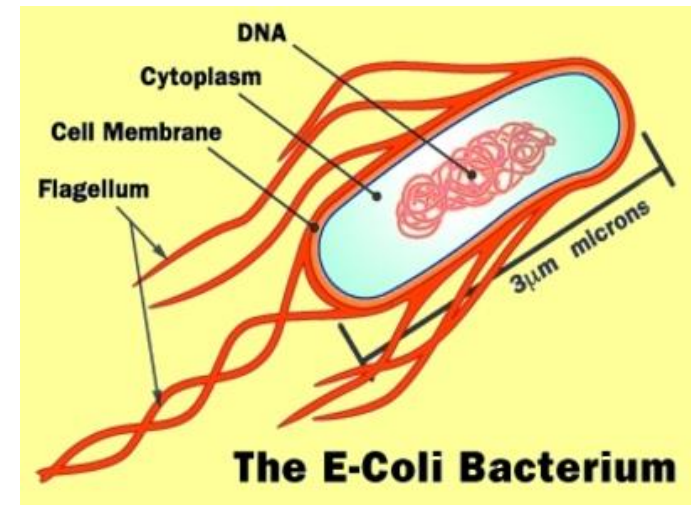
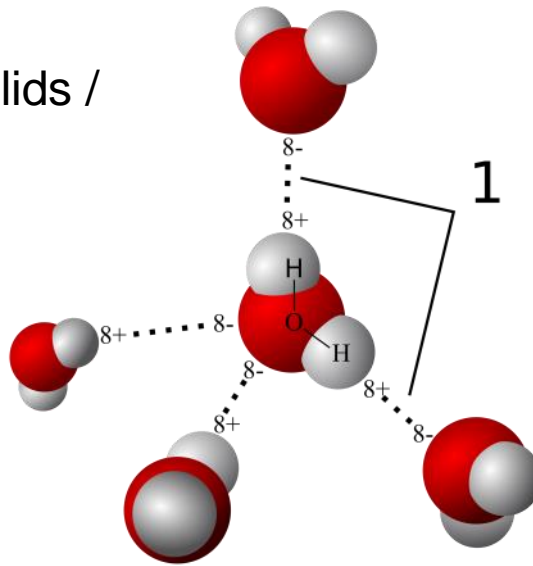
- Faecal coliforms

Physical:

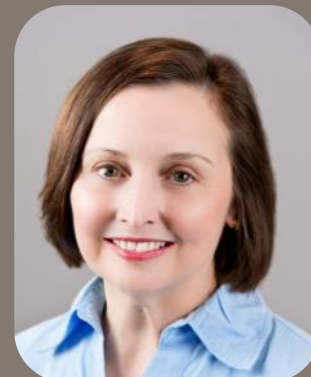
- pH
- Turbidity
- Taste
- Total dissolved solids / conductivity

Chemical:

- Arsenic
- Fluoride
- Nitrate
- Nitrite
- Iron
- Manganese



Water and
Sanitation in Asia
Pacific



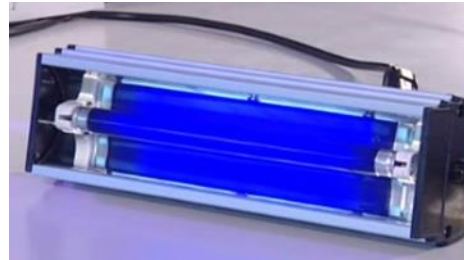
Welcome to Lisa

Natural Disasters and Emergencies: Contaminated Water



- *E. coli* bacteria enter water sources and supplies
 - Via disaster itself
 - Via poor sanitation and hygiene practices in displaced populations
- Electricity, labs, infrastructure unavailable or inaccessible
- Waterborne disease & illness – dysentery, diarrheal, hepatitis, blood and kidney infections

Obstacles to Water Quality Testing in Low Resource & Disaster Areas



- Lab access and expenses
- Complex testing methods too complicated for anyone to use
- Electricity and other resources required
- Extra, cumbersome, expensive equipment required
- No quantitative test results



A Game Changer: Aquagenx Compartment Bag Test (CBT)

- Small footprint - easy to pack and carry
- Simple - don't have to be a microbiologist to use
- Lab-free
- Electricity-free
- Cold chain-free
- No extra equipment needed
- Easy color-change scoring method
- Quantified test results – MPN *E. coli* per 100 mL
- WHO indicator organism and sample volume
- Behavior education and change tool

Developed by Dr. Mark Sobsey



“The development and deployment of an every-person’s test—simple, self-contained, portable, stable, and devised to not need electricity, refrigeration or freezing—to determine water safety could be key for catalyzing global efforts to curb preventable illness and death due to waterborne fecal pathogens.”

Mark Sobsey, PhD
Environmental Health Microbiologist
UNC Gillings School of Global Public Health

THE Ideal On-Site Test for *E. coli*



- Developing countries
- Disaster/emergency settings
- Remote locations
- Low resource settings

Tens of Thousands of CBTs Used by Customers Around the World

- *“The CBT lets us mobilize resources and make informed decisions very quickly in the face of a disaster. We will continue to use the CBT in other disaster settings because of its ease of use and handling, low cost and efficiency.”*

International Federation of the Red Cross

- *“We will continue to use the CBT because we routinely test water sources for the presence of E. coli, and we now prefer to have a clear, quantitative understanding of the magnitude of fecal contamination.”*

Operation Blessing International

- *“I recommend the Aquagenx CBT to anyone who needs to perform microbial testing in low resource areas accurately and simply. The CBT offers the same level of accuracy as laboratory analysis at a fraction of the cost, without the additional steps and hassle of transporting samples to the lab.”*

RTI International

Versatile Applications for the CBT



- Developing Countries
- Disaster/Emergency Settings
- Military
- Private Wells in Developed World
- Recreational Waters
- Agricultural Waters

Aquagenx CBT Products

CBT I Kit (10 tests per kit)



- 10 compartment bags
- 10 *E. coli* test buds
- 10 100 mL sample bottles
- 30 chlorine tablets
- 1 seal clip

CBT II Kit (50 tests per kit)



- 50 compartment bags
- 50 *E. coli* test buds
- 50 100 mL Whirl-Pak Thio Bags
- 1 seal clip

How the CBT Works – Simple Steps



- Collect 100 mL sample
- Dissolve *E. coli* growth medium in sample for ~15 min.
- Pour sample into compartment bag
- Incubate 24-48 hours depending on ambient temperature
- Score and record test results

Works at Variable Temperatures



- Hydrolysis of a chromogenic Beta-glucuronide substrate (“X-Gluc”)
- Other tests require specific temperature control/maintenance in electricity-dependent incubator
- Ambient incubation at 25° Celsius and above, results in 24 hours
- Below 25° Celsius, maintain temp anywhere between 25° - 44.5 ° Celsius

Easy to See Color Change



- *E. coli* chromogenic growth medium turns colors in presence of *E. coli*
- Blue/blue-green color indicates presence of *E. coli* in a compartment
- Yellow/yellow brown color indicates absence of *E. coli* in a compartment
- Concentration of *E. coli* is estimated from combination of positive and negative compartments in the bag

Easy to Score Color-Change Most Probable Number of E. Coli

Compartment #					MPN/100mL	Upper 95% Confidence Interval/100mL	Health Risk Category Based on MPN and Confidence Interval
1 10mL	2 30mL	3 56mL	4 3mL	5 1mL			
					0.0	2.87	Low Risk/Safe
					1.0	5.14	Intermediate Risk/ Probably Safe
					1.0	4.74	
					1.1	5.16	
					1.2	5.64	
					1.5	7.81	
					2.0	6.32	
					2.1	6.85	
					2.1	6.64	
					2.4	7.81	
					2.4	8.12	
					2.6	8.51	Intermediate Risk/ Possibly Safe
					3.2	8.38	
					3.7	9.70	
					3.1	11.36	
					3.2	11.82	
					3.4	12.53	
					3.9	10.43	
					4.0	10.94	
					4.7	22.75	
					5.2	14.73	
					5.4	12.93	High Risk/Possibly Unsafe
					5.6	17.14	
					5.8	16.87	
					8.4	21.19	
					9.1	37.04	High Risk/Probably Unsafe
					9.6	37.68	
					13.6	83.06	
					17.1	56.35	
					32.6	145.55	Unsafe
					48.3	351.91	
					>100	9435.10	Unsafe

- Match color sequence of five compartments of your sample to one of 32 possible outcomes
- Chart provides MPN for each outcome/row and indication of risk, based on WHO risk categories
- Make informed decisions about water quality, particularly in intermediate risk ranges where decisions about water safety are often made

WHO Guidelines for Drinking Water Quality, 4th Edition, 2011

Health Risk Category	E. coli CFU* per 100 mL
Safe	<1
Intermediate Risk/Probably Safe	1-10
High Risk/Probably Unsafe	>10-100
Very High Risk/Unsafe	>100

*MPN and CFU (colony forming units) are equivalent terms, but MPN is obtained in quantal tests such as the CBT and CFU is obtained in colony-based tests such as membrane filtration

Upper 95% Confidence Interval

Compartment #					MPN/100mL	Upper 95% Confidence Interval/100mL	Health Risk Category Based on MPN and Confidence Interval
1	2	3	4	5			
10mL	30mL	56mL	3mL	1mL			
					0.0	2.87	Low Risk/Safe
					1.0	5.14	Intermediate Risk/ Probably Safe
					1.0	4.74	
					1.1	5.16	
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					13.6	83.06	
					17.1	56.35	
					32.6	145.55	
					48.3	351.91	
					>100	9435.10	Unsafe

- Highest possible MPN value that could possibly be detected if the same sample is tested repeatedly
- Represents worst case MPN upper limit that would not be exceeded on average 95 times out of 100 if the same sample is analyzed repeatedly
- Combined MPN value and upper 95% confidence level = solid, reliable quantitative data

Reliable Results in Comparison to Other Test Methods



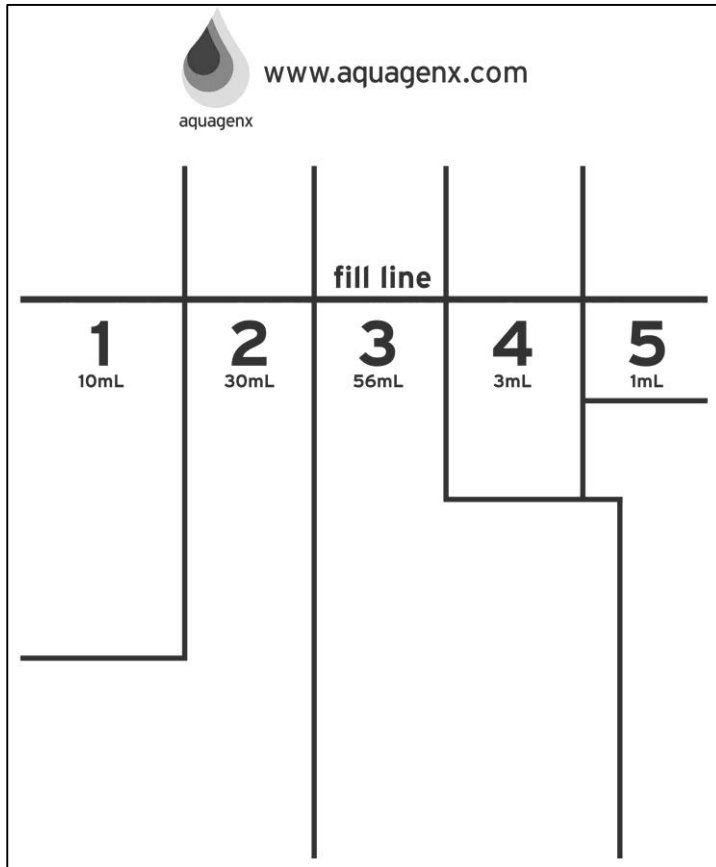
- Tested extensively in labs and in the field by independent parties against other standard testing methods
- Reliable results comparable and on par with more complicated, expensive and less portable tests
- Large scale trials documented in studies by USAID, UN-HABITAT, academic institutions and other collaborators
- See [Comparative Studies & Performance Data](#) on our website

Pricing for CBT Kits



- Volume-based pricing for CBT Kits
- CBT eliminates costs for:
 - lab sample analysis and processing, electricity, a cold chain, sample transportation, extra equipment, specialized technicians
- Aquagenx wants to work with IFRC on procurement program and pricing

Upcoming New Design for Compartment Bag



- Easier to use
- Numbered compartments
- Numbered volumes
- Outlined compartments
- Black fill line across bag
- White background, easier to see color change in small compartments
- Thicker plastic

Potential Product Development

Other parties make inquiries about new bacteriological tests based on same principle and method as CBT *E. coli* test:

- Quantitative H₂S test
- Quantitative total coliform/*E. coli* test
- Quantitative cholera test
- Chromogenic *Enterococci* test

Water and
Sanitation in Asia
Pacific

Please Contact Us!



Aquagenx

Safe water for anyone, anywhere, anytime

www.aquagenx.com

Lisa Hirsh

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1+919-590-0343



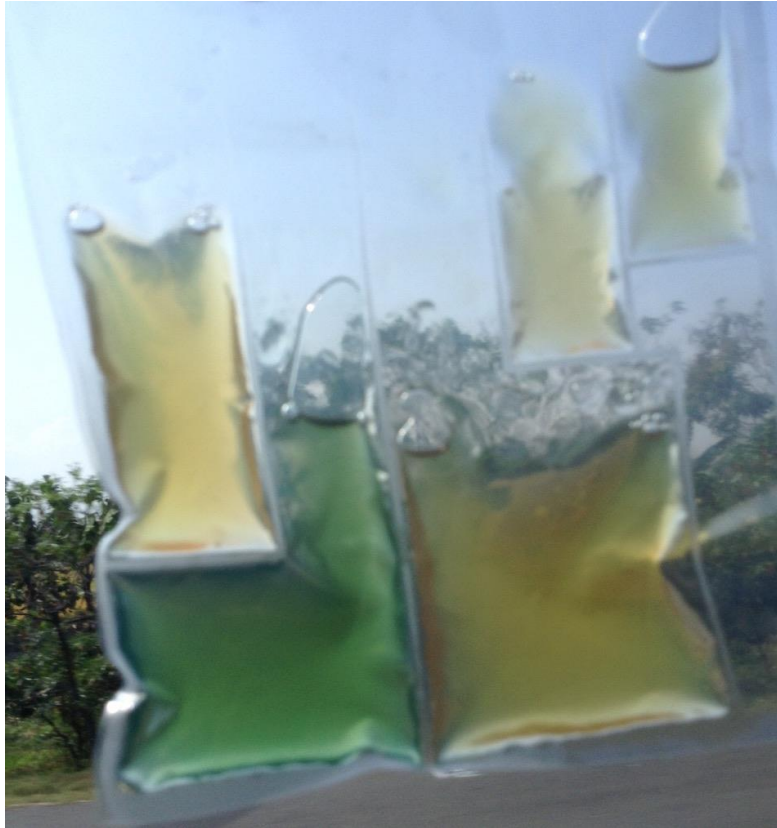
[@Aquagenx](https://twitter.com/Aquagenx)

Water and
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Pacific



Welcome to Stuart

CBT in Use



**First CBT test
result from
Bandung,
Indonesia 2014**

Compartment #2!

CBT in Use: Timor-Leste



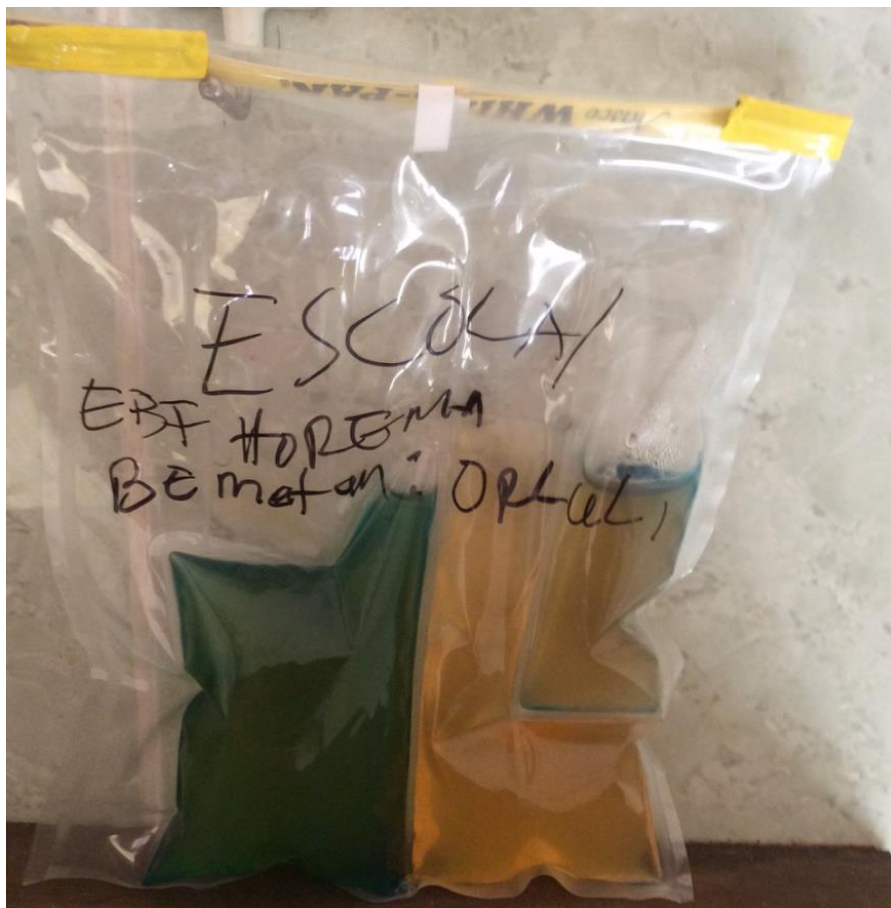
**Training on use
in Timor-Leste
using 100mL
sample bottle**

CBT in Use: Timor-Leste



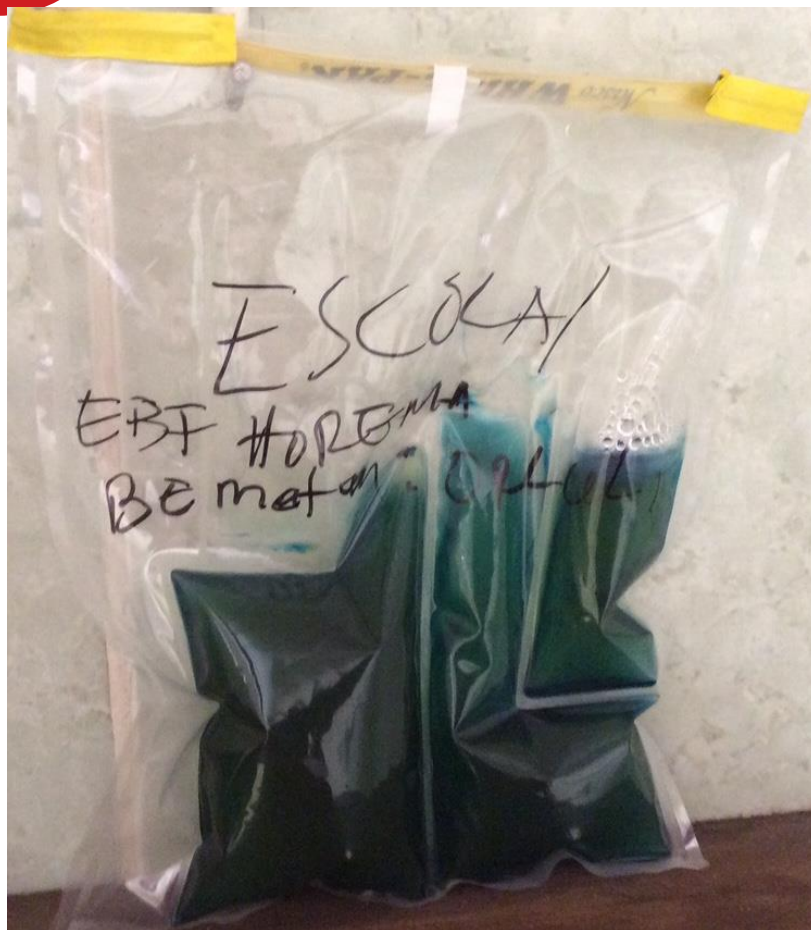
**CVTL
transferring
sample from
Whirl-Pack Thio
Bags to CBT**

CBT in Use: Timor-Leste



**CBT result from
TL, partly
reacted (note
green traces on
compartment
#1)**

CBT in Use: Timor-Leste



**CBT result from TL,
fully reacted: Safe
or Not???**

CBT in Use: Nepal



**CBT result from
Nepal water
tankering
operations: Safe or
Not???**

CBT in Use: Nepal



**CBT results from
three Nepal spring
sources: which one
is safe?**

CBT in Use

Has been used with
RCRC for:

- Malaysian Floods Operation;
- WASH programming in Myanmar



Water and
Sanitation in Asia
Pacific



Thank You - Questions