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This presentation is used with
Lesson Plan 6: Intro to
Microbiological Testing in the
Drinking Water Quality Testing
Trainer Manual

Available at

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Introduction to Microbiological Testing Methods



Learning Expectations

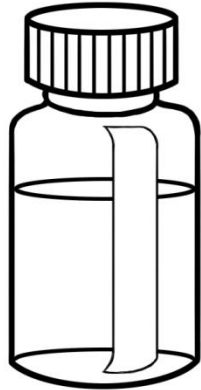
1. Identify 3 microbiological test methods: presence-absence, most probable number, and membrane filtration.
2. Discuss the advantages and limitations of different microbiological test methods.



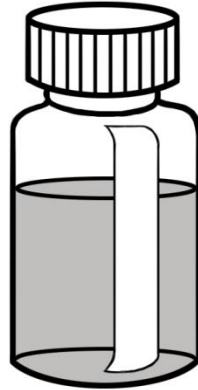
Microbiological Testing Methods

- Presence-Absence (P-A)
- Most Probable Number (MPN)
- Membrane Filtration

Presence-Absence (P-A)



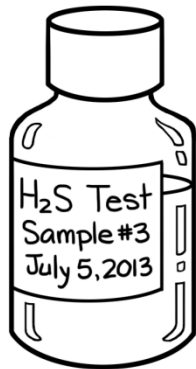
Negative



Positive for
Coliforms



Positive for
E. coli



Black water is
positive result
for H₂S bacteria
and likely fecal
contamination

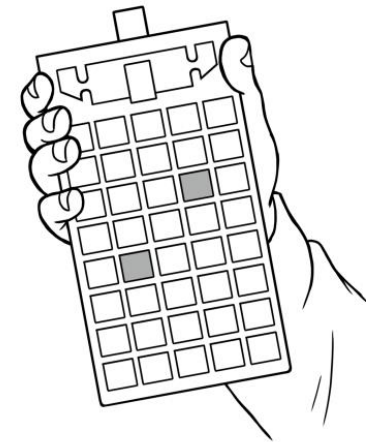
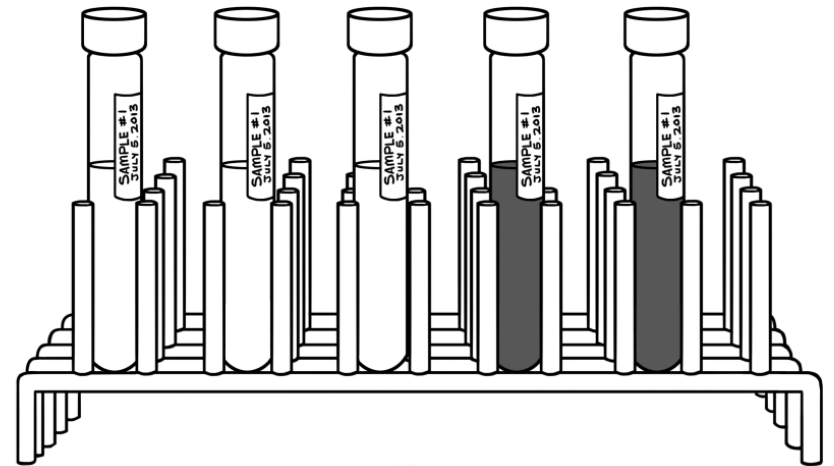
Presence-Absence (P-A)

- Simplest method
- Does not show numbers of bacteria!
- If positive results, water should be re-tested using membrane filtration to determine the number of bacteria
- Not recommended for testing treatment effectiveness of household water treatment and safe storage

Most Probable Number (MPN)

Example Table for 10 Test Tubes

# Positive Tubes	MPN Index (CFU/100 mL)
0	<1.1
1	1.1
2	2.2
3	3.6
4	5.1
5	6.9
6	9.2
7	12.0
8	16.1
9	23.0
10	>23.0

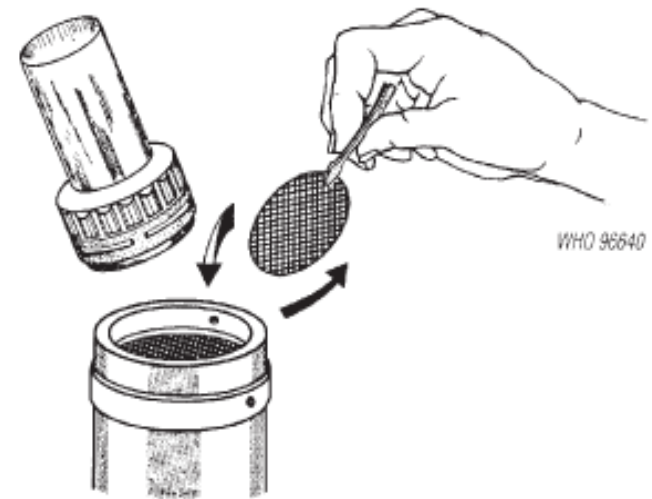
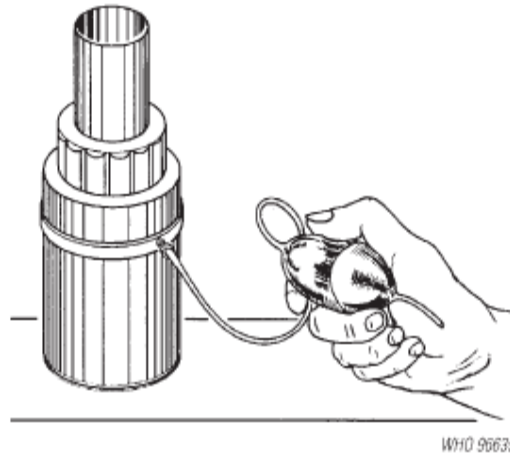
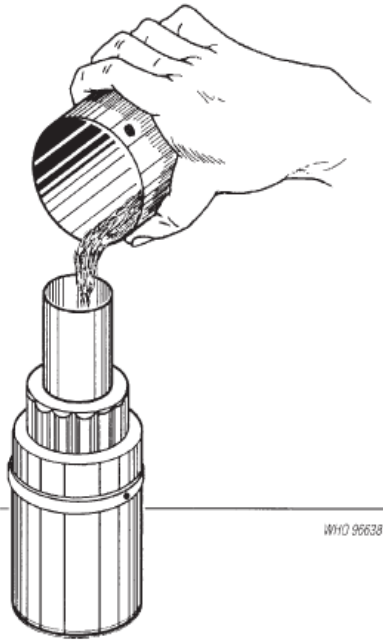


Multiple wells in a disposable tray (1 mL each)

Most Probable Number (MPN)

- Estimates number of bacteria most likely to be in water sample
- Procedure:
 - Add water to 5-10 test tubes (or trays of 10–96 wells) containing culture media
 - Incubate for 24-48 hours
- Statistical method based on the number of positive tubes or wells
 - Using a table provided, the number of positive tubes is reported as the MPN /100 mL

Membrane Filtration (MF)



Credit: WHO, 2007

Membrane Filtration (MF)

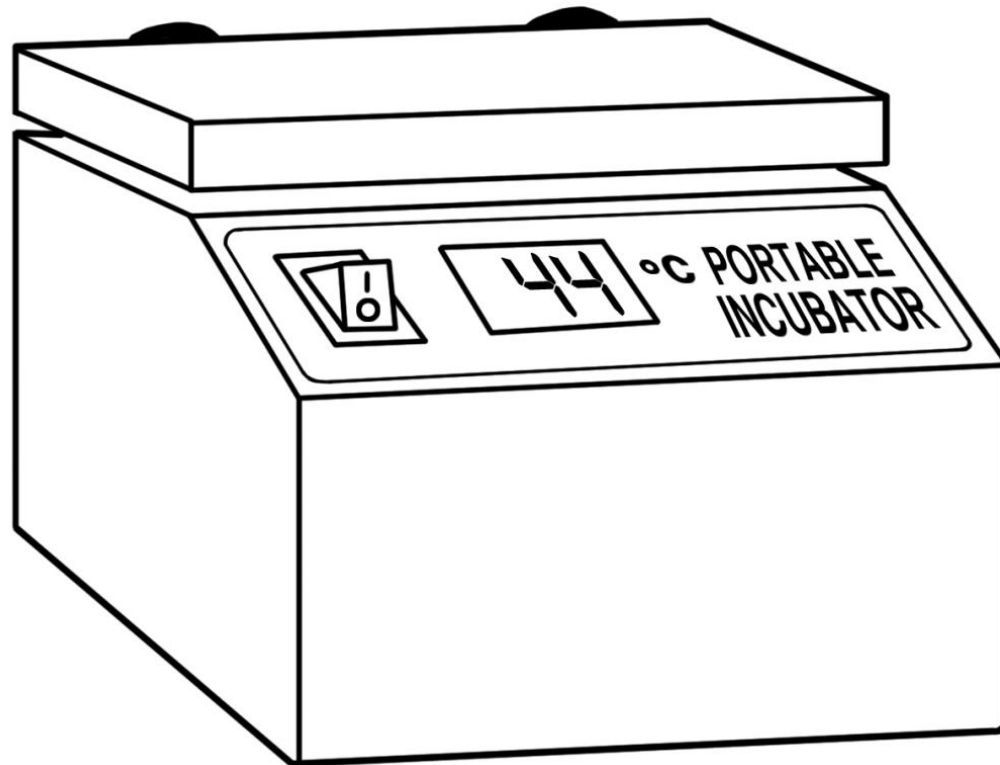
- Most accurate and internationally recognized method
- Procedure:
 - Filter 100 mL water sample
 - Add culture media to a Petri dish to provide nutrients for indicator organisms to grow
 - Transfer the membrane filter paper to Petri dish
 - Incubate for 24-48 hours
- Colonies will appear on filter paper and can be counted
- Results reported as colony forming units per 100 mL of water sample (CFU/100 mL)

Portable Field Kits



Credit: Palintest, no date

Portable Incubator



Disposable Membrane Filtration Equipment



Credit: Micrology Labs, no date

What are the Advantages and Limitations?

- Presence Absence (P-A)
- Most Probable Number (MPN)
- Membrane Filtration (MF)