IN THE LOOP

Coliforms: The Water Quality Indicator

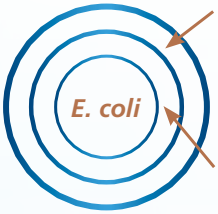
ESCO SCIENTIFIC

Water is one of the most valuable resources on the planet. It is used for various applications such as recreation, washing, and drinking. The determination of water quality is vital to ensure that it is safe for consumption. To be classified as potable water, the water sample should contain zero microorganisms like coliform bacteria.

WHAT ARE COLIFORMS?

Coliform bacteria are microorganisms found in the digestive tract and feces of animals and humans. They are also present in plants and soil. Coliforms do not necessarily cause illness but are indicator organisms for the presence of disease-causing organisms. It is expensive and impractical to test for all possible pathogens in a water sample. Testing for coliforms is more effective since they originate from the same sources as pathogenic organisms and the method is simpler and cheaper. Therefore, finding coliforms in a water sample signifies the presence of pathogens.

TOTAL COLIFORM, FECAL COLIFORM, AND *E. COLI*



Total Coliform
Total Coliform = Environmental Contamination

Fecal Coliform
Fecal Coliform + *E. coli* = Fecal Contamination

Total coliform bacteria are generally found in the environment like in the soil or bodies of water. Environmental contamination is the probable cause if only total coliforms are detected. Thus, pathogens could have also entered the system from the environment.

Fecal coliforms are bacteria grouped under total coliforms and are found in the intestines and feces of animals and humans. Identifying these type of coliforms in a water sample is a strong indication of fecal contamination and present the risk of containing pathogen from the same source.

Escherichia coli (E. coli) is a species under the fecal coliform group. Similar to fecal coliforms, it is found in the intestine and feces of animals and humans and indicates the possible presence of pathogens from fecal contamination.

TOTAL COLIFORM AND *E. COLI* TEST PROCEDURE

Water Collection

Medium Preparation

An absorbent pad is placed in a petri dish then nutrient broth is added.

Sample Preparation

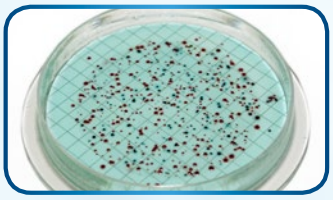
The water sample is diluted, taking note of the dilution factor. The sample is then filteredthrough a filter membrane using a vacuum.

Inoculation

The filter membrane is transferred into the petri dish.

Incubation

The sample is incubated at 35°C for 24 hours.



Microbial Count

Count the red and blue colonies for the total coliform count and the dark blue colonies only for the *E. coli* count.

Since it is important to avoid further contamination of the sample and exposure to possible pathogen, this procedure is performed in an aseptic environment. Aseptic techniques and primary containment are used to ensure cleanliness and safety. Esco offers a wide range of equipment designed to keep the area clean and the operator safe.

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References:
[1] Coliform Bacteria in Drinking Water. (n. d.). https://www.doh.wa.gov/communityandenvironment/drinkingwater/contaminants/coliform
[2] Coliform Bacteria in Drinking Water Supplies. (2017). https://www.health.ny.gov/environmental/water/drinking/coliform_bacteria.htm#:~:text=Total%20coliform%20counts%20give%20a,in%20human%20or%20animal%20waste.
[3] Method 1604: Total Coliforms and Escherichia coli in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium). (2002). https://www.epa.gov/sites/production/files/2015-08/documents/method_1604_2002.pdf

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