

Difference Between Coliform and Fecal Coliform

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Key Difference – Coliform vs Fecal Coliform

It has become an essential factor to ensure the quality of drinking water in the modern world. Testing for all pathogenic organisms in water is expensive and time-consuming. The best approach to confirm the safety of water for consumption is testing for coliforms. Coliform is a gram negative non-spore forming bacteria with a typical rod shape. There are three main sub categories of coliforms and fecal coliform is one of them. The key difference between coliform and fecal coliform is that **fecal coliforms grow at higher temperatures and are only associated with the fecal matter of warm blooded animals.**

How to Identify Coliforms?

Coliforms are used as a parameter in water quality testing during sanitary assurance of drinking water and related other food products. Eosin methylene blue agar plate is used to distinguish between different types of coliform bacteria. The plate is inhibitory to gram positive bacteria and will produce a color change in gram negative bacteria. The production of color is based on the ability of gram negative bacteria to ferment lactose. Organisms which ferment lactose strongly will appear in dark blue or purple color. Fecal coliforms such as *Escherichia coli* appear in dark colored colonies with a soft luster of metallic green on the surface. Other coliforms will appear in thick slimy colonies and non-fermenters will appear colorless.

What are Coliforms?

Coliforms are rod shaped, non-spore forming gram negative bacteria. They can be motile or non-motile and has the ability to ferment lactose when incubated at a temperature range of 35 °C to 37 °C. Coliforms are present in many different environments such as soil, vegetation, aquatic habitats and fecal matter of all warm blooded animals including humans. They are used as indicators to determine sanitary quality in water and food products. Nonetheless, their presence in drinking water indicates the potential risks of pathogenic organisms present in water systems. Coliforms are of three categories. Each category has its own level of risk and is an indicator for quality of drinking water.

1. Total coliforms
2. Fecal coliforms (Sub group of total coliforms)
3. *Escherichia coli* (Sub group of fecal coliforms)

Total coliforms are generally considered as harmless. If the water is tested and total coliforms are detected it is considered as a harmless environmental source and contamination of fecal coliform is unlikely.

What are Fecal Coliforms?

Fecal coliforms are a sub group of total coliform bacteria. Fecal coliforms are a group of bacteria associated with the fecal matter of warm blooded organisms. They reside in the intestines of warm blooded organisms and are passed to the environment through fecal excrement. When compared with other coliforms, fecal coliforms have the ability to grow at elevated temperatures and when they are incubated at 44⁰C, they have the ability to ferment lactose while producing different other gaseous forms. Fecal coliforms are mainly used in the sanitary quality assurance of drinking water. If present, it is said to be that water is contaminated with fecal matter and indicate a potential risk to individuals who consume this water. *Escherichia Coli* is a sub group of the fecal coliform group and is a common member. The presence of fecal coliforms in a water sample indicates a probable fecal contamination and this affects humans than any other aquatic organisms. Not all forms of *Escherichia coli* are pathogenic. Fecal coliforms, especially virulent forms of *Escherichia coli* (O157: H7) have the ability to cause many lethal disease conditions like gastroenteritis.

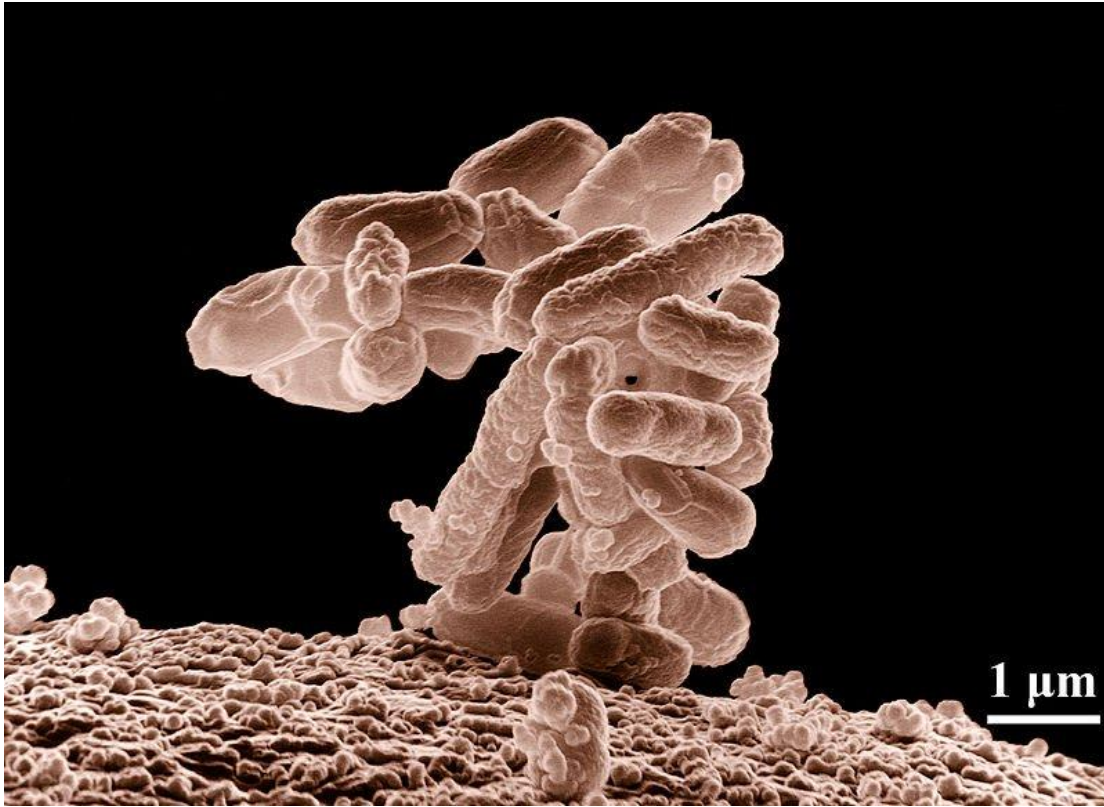


Figure 02: Fecal coliform *E. coli*.

What are the similarities between Coliform and Fecal Coliform?

- Both coliforms and fecal coliforms are indicators of water contamination and used as a parameter in sanitary quality assurance procedures.
- They are gram negative non-spore forming bacteria with a typical rod shape.
- Both groups are present in aquatic habitats, soil, and vegetation.
- Both types ferment lactose.

What is the difference between Coliform and Fecal Coliform?

Coliform vs Fecal Coliform

Coliforms have three main sub divisions: total coliforms, fecal coliforms, and *Escherichia coli*.

Fecal coliforms belong to the sub category of total coliforms.

Pathogenicity

They are harmless.	They have the ability to cause many lethal disease conditions.
Lactose Fermentation	
Coliforms ferment lactose in a temperature range of 35 °C to 37 °C.	Lactose fermentation is done when incubated at a temperature of 44 °C.
Temperature Tolerance	
They survive at comparatively lower temperatures than those of fecal coliform.	These have the ability to grow at elevated temperature ranges.
Testing on Eosin Methylene Blue Agar Plate	
They appear in thick slimy colonies.	They appear in dark colored colonies with a soft luster of metallic green on the surface.

Summary – Coliform vs Fecal Coliform

Coliforms are a group of bacteria that are present in different environments. The presence of them in water systems is considered as a level of contamination. There are three different types of coliforms. The presence of total coliforms in water is considered as less harmful but the presence of fecal coliforms including *Escherichia coli* is considered as a level of fecal contamination, which leads to different lethal disease conditions. This is the difference between coliforms and fecal coliforms. Tests for coliforms are conducted to ensure the sanitary quality of drinking water.

References:

1. “Coliform Bacteria in Drinking Water.” Washington State Department of Health. N.p., n.d. Web. [Available here](#). 01 Aug. 2017.
2. Oram, PG Mr. Brian. Water Testing Fecal Bacteria Pathogenic Organisms Water. N.p., n.d. Web. [Available here](#). 01 Aug. 2017.

Image Courtesy:

1. "E coli at 10000x, original" By Photo by Eric Erbe, digital colorization by Christopher Pooley, both of USDA, ARS, EMU. – released by the Agricultural Research Service, the research agency of the United States Department of Agriculture, with the ID K11077-1. (Public Domain) via [Commons Wikimedia](#)

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