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Opinion

# Note on Fecal Contamination of Fresh and Marine Waters

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## DESCRIPTION

Indicator bacteria are microorganisms that are used to detect and assess the amount of faeces in water. They aren't harmful to people's health, but they are utilised to signal the presence of a health concern.

There are around 100 billion bacteria per gram of human faeces. These bacteria could include harmful bacteria linked to gastroenteritis, such as *Salmonella* or *Campylobacter*. In addition, dangerous viruses, protozoa, and parasites may be found in faeces. Waste water treatment plants, livestock or poultry dung, sanitary landfills, septic systems, sewage sludge, pets, and wildlife can all release faeces into the environment. Fecal pathogens can cause disease if consumed in large enough quantities. Pathogens in ambient waters are challenging to test for individually due to their diversity and typically low quantities. As a result, public agencies employ the presence of other faecal bacteria that are more common and easier to detect as indications of faecal pollution. Bacteria can be present in oral and gastrointestinal contents in addition to faeces.

The microbiological quality of water is assessed using faecal indicator microorganisms. These bacteria are connected with faecal pollution and the likely presence of waterborne pathogens, despite the fact that they do not usually cause disease. The faecal indicator bacteria are grown in the lab under conditions that promote their growth while inhibiting the growth of non-fecal indicator bacteria and, in certain cases, provide special identification clues. Current testing involves passing a precise amount of water through a filter, which is then poured onto a dish containing a gelled growth medium. The test dish (also known as a Petri dish or Petri plate) is incubated at a specific temperature for a set amount of time. Each single cell of a faecal indicator bacterium present in the initial water will have reproduced enough to generate a noticeable "colony" of bacteria by the end of the test. To increase the accuracy of the test results, dyes or specific chemicals may be added to the test growth medium, resulting in faecal indicator bacteria that are a different colour than non-fecal indicator bacteria growing under the same conditions. Total coliform bacteria, faecal coliform bacteria, *Escherichia coli*, faecal streptococci,and enterococci can all be tested using different methods. Fecal coliforms are a subset of total coliforms, with *Escherichia coli* being a specific genus and species. The enterococci are a type of faecal streptococci that is a subgroup of the faecal streptococci. Depending on the test used, water quality can be interpreted in a variety of ways. Fecal streptococci, for example, are thought to live longer in water than some coliform bacteria and are associated with animal wastes rather than human wastes. Waste waters from sewage treatment plants, other types of sewage inputs such as combined sewer outfalls and drainage from septic tanks, runoff from agricultural fields or feedlots, effluents from food processing plants (especially meats and beverages), and stormwater runoff are all sources of faecal indicator bacteria (which carries animal and bird droppings). The probability that faecal indicator bacteria introduced into the environment through these methods will survive long enough to be counted at a given water quality monitoring site is a function of the site's distance from such sources, as well as the effect of all environmental factors that influence bacterial survival.

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