

Water Contaminant of the Month

E. coli or *Escherichia coli*, is a type of bacterium which includes hundreds of strains. It is named after its discoverer, Dr. Theodor Escherich, who first observed it in 19-th century Germany. *E. coli* is a type of fecal coliform bacteria, meaning that it is found naturally in the intestines of humans and animals. The rod-shaped *E. coli* cell is typically about 0.5 microns in diameter and 2 microns long.

E. coli is found in surface water, ground water, and agricultural and municipal runoff water. The presence is a strong indicator of recent contamination by human sewage or animal manure. The standard water quality test for coliform bacteria can be positive without *E. coli* being present. Most strains of *E. coli* are harmless, but some can cause serious diseases. The O157:H7, O121 and O104:H21 strains are some that have been in the news for causing major disease outbreaks. For example, in 1999 a water well at the Washington County Fairgrounds in upstate New York was contaminated by the O157:H7 strain via manure from a nearby animal barn. The result was 1000 people sickened, with 65 hospitalizations and 2 deaths.

An *E. coli* infection might produce no symptoms at all, but it typically can cause abdominal cramps, nausea, vomiting and diarrhea. Symptoms usually appear within 6 to 12 hours of exposure. Most people with normal immune systems recover without treatment within 10 days. The usual methods of infection are through eating improperly cooked ground beef or sausage; eating unwashed, contaminated fresh vegetables; drinking unpasteurized milk or juices; or drinking or swimming in sewage-contaminated water. Some strains can also cause urinary tract infections and neonatal meningitis. In young children, the elderly and the immunocompromised *E. coli* O157:H7 can cause hemolytic uremic syndrome, a life-threatening condition which destroys red blood cells and leads to kidney failure.

The US EPA requires regular testing of public water supplies for coliform bacteria under the Total Coliform Rule. The maximum contaminant level goal (MCLG) for total coliforms is zero. If more than 5 per cent of the samples tested in a month show the presence of coliforms it must be reported to the public, and corrective actions may be required. The detection of *E. coli* creates a “direct health risk.” The testing frequency required is determined by the size of the water system. Private water wells are not governed by these rules, but regular testing for coliform bacteria is recommended.

Removal of *E. coli* from water can be effectively accomplished by ultraviolet irradiation, distillation, boiling, chlorination, ozonation, iodine treatment, or finer filtration methods, including reverse osmosis, ultrafiltration and nanofiltration.

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