



Bacteria and Cryptosporidium in Drinking Water

The greatest number of enquiries we receive relating to contamination in water involve Coliform bacteria in the water, particularly the bacterium *E.coli*. There were a number of other inquiries concerning the protozoan parasite *Cryptosporidium* which has been found in drinking water supplies.

The presence of these pathogens in groundwater throughout Ireland is cause for concern because they can infect humans and lead to serious illness.

The EPA report on the quality of drinking water in Ireland states that universal indicator organisms for the presence or absence of pathogens originating in sewage are coliforms, specifically *E.coli*. Their presence is proof that faecal contamination has occurred and that there is a potential presence of pathogens.

EU and Irish Drinking Water Regulations require that public drinking water supplies have zero levels of total coliforms and faecal coliforms per 100 ml. It is thought that most faecal coliforms (*E.coli*) in Western Ireland water supplies comes from the faeces of animals, with some contamination due to human faeces. The most common animal source is thought to be cattle and sheep.

How does *E.coli* get into the water supply in Western Ireland? The presence of a large animal population, agricultural activities such as the spreading of slurry, thin soil and overburden material above cracked layers of limestone may create opportunities, especially during periods of heavy rainfall, for the bacteria to be delivered to an underground water supply; however, it is

difficult to ascertain the exact source of contamination.

Treating water to render it safe for drinking commonly involves chemical disinfection with chlorine, filtration systems or ultra-violet sterilization. Successful treatment requires an initial bacteriological analysis, followed by appropriate treatment methods backed up with proper maintenance and monitoring procedures, including follow-up analysis. Unless a recent water analysis proves otherwise all water supplies, except for major municipal systems, which are carefully monitored, should be checked periodically for the presence of Total Coliforms and *E.coli* bacteria.

Consumers should request a bacteriological analysis of their water supply before the installation of water treatment equipment and the work should not be considered complete until an analysis report is presented showing zero Total Coliform and *E.coli* counts from a water sample taken after equipment installation. An ongoing aftersales testing program would be a valuable addition to any treatment system particularly for the treatment of harmful bacteria.

Another notable pathogen in drinking water is a parasite called *Cryptosporidium* which grows within host animals such as sheep and is excreted as an oocyst in faeces. The oocyst can survive disinfection and ultra-violet treatment before lodging in the intestine where it produces toxins resulting in gastro-enteritis and severe diarrhoea.

Much is known about this parasite because of studies carried out in North America and Europe; however, while it is known to be in Ireland there is no information on

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contamination levels. It can be reasonably assumed that the reasons for faecal contamination, as previously discussed, lead to a high risk of Cryptosporidium oocysts in water supplies in Western Ireland and may be a significant cause of human gastro-enteritis.

Water to the whole house can be effectively treated for faecal coliforms with ultra-violet sterilization but this will not guard against parasites. A drinking water filtration system with a rejection level of no greater than one micron will successfully remove Cryptosporidium and other parasites. Certain filtration systems, specifically ceramic technology, are very effective for this purpose and will also remove faecal coliforms. Some filtration systems which kill through the use of chemicals such as iodine should be avoided by persons who are sensitive to chemicals.

In summation, ultra-violet sterilizers should be used for whole house protection against faecal coliforms and ceramic based filters can be used to produce small amounts of bacteria, parasite free water for drinking and cooking purposes. These systems are the safe and reliable when properly installed and maintained.

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