

Advice Sheet 2 – Bacteriological Water Quality



Introduction

The most common problem associated with private water supplies is bacteriological contamination. The presence of certain types of bacteria in water indicates that the water is contaminated with faecal matter of an animal origin or sewage.

Testing for Bacteriological Contamination

The recognition that faecally polluted water can be responsible for the spread of disease has led to the development of sensitive methods for examination to ensure that water for human consumption is free from bacteriological contamination. It is impracticable to monitor drinking water for every possible microbial pathogen. A more logical approach is the detection of organisms normally present in the faeces of human and other animals as indicators of faecal pollution. There are various bacterial indicators used for this purpose, the most widely accepted being the coliform group particularly *E.coli*. The presence of such organisms indicates the presence of faecal material and, hence, that intestinal pathogens may be present. Conversely, their absence indicates that pathogens are probably also absent. It should, however, be noted that a single laboratory examination of a water does not justify the conclusion that all is well and that the supply will remain suitable for drinking purposes. Contamination is often intermittent and may not be revealed by the examination of a single sample.

The interpretation of a result showing the presence of coliform organisms but no *E.coli* is more difficult. Whilst they can occur in water sources as a result of contamination by soil washings or from growth on decaying vegetation, they may equally indicate historical faecal contamination, at a time sufficiently remote to have allowed *E.coli* to die out, or may herald the onset of more dangerous pollution in the future.

When coliforms are detected but are found not to be *E. coli*, examination for Enterococci, which survive in water rather longer than coliforms, may help clarify whether the coliforms were faecal in origin.

The Dangers

There are a number of human pathogens which can potentially be transmitted in faecally contaminated water, those of particular significance are salmonella, campylobacter and E. coli O157. For methods of water treatment to deal with these bacteria please see Advice Sheet 3 - Bacteriological Treatment Methods.

A further risk with faecally contaminated private water supplies is the transmission of the parasitic organisms *Cryptosporidium* or *Giardia*, which infect man and a wide range of domestic and wild animals. Occurrence of these organisms is usually seasonal, normally found after heavy rainfall in the spring and autumn when animal faeces are flushed into water courses. Because these parasitic organisms are resistant to disinfection methods such as chlorination and Ultra Violet sterilisation, the most successful method of removing them from a supply is by filtration, usually 1 micron in size.

Contamination of private water supplies can occur where there is poor control over the spreading of slurries from farm animals, inadequate source protection, access of animals to the catchment and poorly maintained collection chambers, tanks and pipework. Therefore, the quality of water obtained from a private supply will depend very much upon the integrity of the source and the methods of collection conservation and distribution adopted. The quality of water from some supplies can be improved a great deal by taking simple steps to stop pollution getting into the supply. For further information please see Advice Sheet 1 – Protecting Water Sources.

If any sources of contamination can be identified then appropriate preventative measures should be undertaken after which the system should be flushed with a hypochlorite solution (correctly diluted) to destroy any bacteria remaining in the system. The system should then be retested to ensure that the preventative measures have been successful. The improvements need to be inspected and maintained regularly for them to be effective.

If the source of the supply is itself polluted, or contamination cannot be successfully eliminated from the supply, then it will be necessary to find an alternative source or treat the water to destroy the bacteria. For further information please see Advice Sheet 3 – Bacteriological Treatment Methods.

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