Treating Contaminated Water Supplies

The first choice for a domestic water supply is one that will not "make us sick" (be free of pathogens), or cause scaling problems in pipes, fittings and hot water services. This water should be clear of suspended solids (clays, organics), colourless, odourless and looks "sparkling". But clear water does not guarantee the water is free from nasty bacteria.

Filtration through porous materials can be used to remove solid particles and some bacteria but not viruses. Filters 5 µm (micron) or smaller can remove a large proportion of parasites, however, bacterial regrowth on the filters may occur is they are not changed regularly.

It's very expensive to test for organic contaminants and their removal in a carbon filter is one way of protecting our water. Rainwater can be contaminated by tastes of rotting leaf litter or soot from chimney residues. Activated carbon will remove most odours and tastes and some bacteria.

Herbicide and pesticide contamination of water is expensive to identify. If in doubt, don't use for drinking or washing.

Chemical treatment involves dosing the water with a chemical that will kill bacteria. Chlorine is used in town water supplies, but chlorine only kills some of the bacteria and is poor at treating virus and protozoa. Chlorine is hazardous and not easily used at the domestic level as it requires precise doses to be effective but at levels not harmful to humans.

Powdered chlorine products such as swimming pool products (sodium or calcium hypochlorite) should NEVER be used to chlorinate drinking water supplies.

Boiling is the least expensive disinfecting technique, however, boiling for 15 minutes is generally required for it to be effective. Boiling is not effective for water contaminated by "blue-green algae". When water is in short supply, it's better to use poor quality water for toilet flushing and the laundry and save the best quality for drinking.

Water for Animals

Drinking water for livestock should contain less than 100 cfu/100 mL, although many animals tolerate higher levels.

Lanfax Laboratories

Independence

Lanfax Labs - an independent, commercial and research organisation with special interests in soil, water and wastewater analysis, and effluent management.

Quality Management Systems

Lanfax Labs successfully participate in a range of proficiency testing programs at the National level to ensure quality control using recognised methods and standard procedures for soil, water and plant analysis. All tests are performed according to approved methods and proficiency testing programs.

Water Quality Analysis

Lanfax Labs provide a range of tests and assessments to Universities, Government Agencies, Local Authorities, commercial operators and individuals for:

Drinking water, Irrigation and Stock Water
Groundwater impact assessment
Wastewater reuse and recycling
Greywater and stormwater management
Domestic effluent and urban sewage
Surface and river water monitoring
Liquid Trade Waste

Soil Physical and Chemical Properties

Lanfax Labs provide soil sample analysis for:
Agricultural, pastoral & horticultural use
Wastewater application - commercial and domestic
Manure and biosolids application to land
Salinity and Sodicity
Land reclamation and subdivisions

On-site Effluent Disposal

Lanfax Labs can provide domestic on-site wastewater system design to meet Local Government regulation.

Laundry Product Research & Greywater Reuse

Lanfax Labs has researched phosphorus and salinity components of laundry detergents. This information is published on our website or available from the lab at no charge.

Lanfax Laboratories

Soil and Water Resource Consultants

BACTERIAL TESTING PROCEDURES

FOR SAMPLE COLLECTION

Phone Lab(02) 6775 1157

ABN: 72 212 385 096
email: lanfaxlabs.@bigpond.com.au
Website: http://www.lanfaxlabs.com.au

Postal Address: P.O. Box 4690 Armidale NSW 2350
Laboratory: 493 Old Inverell Road Armidale 2350

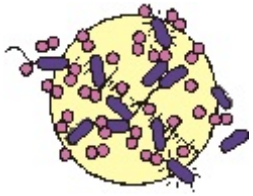
Prices apply from January 2016

BACTERIAL TESTING

Bacterial contamination of water supplies can occur from a variety of sources at any stage of the collection, storage and distribution cycle. Water from wells, bores, dams and creeks can be contaminated from native and domestic animals, surface water runoff, or leaking sewers and septic tanks.

The water we drink should have a sufficiently high quality that we do not suffer any ill-effect from the water. Because it is expensive to test for the wide range of bacteria that may make us sick, a few organisms are used to indicate the likelihood of water being contaminated. The absence (or low levels) of these bacteria is paramount to good water quality.

Because **bacteria** grow in colonies, the ***faecal coliform test*** is performed to measure the number of colonies incubated from a sample of the water. These bacteria are used to indicate the likely risk of the water being contaminated. Drinking water samples should have less than one colony forming unit per 100 mL. *E.coli* is one of these indicator organisms.



The ***total coliform test*** determines the level of all coliform bacteria in water. This test is usually done to determine the efficiency of disinfection rather than potential contamination as many bacteria come from the natural, non-infectious types.

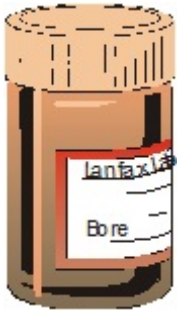
Protozoa (single-cell organisms) are found in water and soil and have beneficial and harmful outcomes. Harmful parasites common in polluted waters include *Cryptosporidium* and *Giardia.* The methods for determining the presence of these parasites are very expensive and the results not always conclusive of infectious levels. Filtration at 5 µm is an efficient method to remove these protozoa from water.

Blue-green algae (C*yanobacteria*) are common in soil and water ecosystems. They can be toxic during "blue-green algal blooms" and their distinctive smell (like musty old leather) can be a simple identifying signature.

Routine tests are faecal coliform, *E.coli* and total coliform tests.

SAMPLE COLLECTION

Obtain a ***STERILE*** 250 mL plastic jar from our lab. We will not accept water in any other type of container for the bacteria tests.

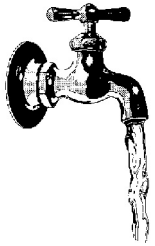


Precautions: Your hands, clothing and other objects can be contaminated by bacteria - avoid touching the inside of the jar.

Label the jar while it is dry with the following details: Name of owner
Location
Source of water (tank, bore, spring, dam)
Date, time of sampling

TAP WATER (rainwater, well, bore)

Open the tap from which you will obtain the sample, allow the water to run for several minutes until the water coming from the tap is a true sample of the supply, rather than the water that has been standing in the pipes for long periods.



Open the sterile jar immediately prior to filling. Hold the jar in one hand and the lid in the other, hold each firmly while filling the jar. DO NOT place the lid on the ground or any other surface. DO NOT place fingers into the jar and DO NOT allow the jar's lip to touch the tap while you are filling.

Fill the jar to a level just above the screw thread (jar does not need to be full). Screw on cap tightly. Place jar in esky with ice.

The sample needs to be returned to Lanfax Laboratories within 30 min of sampling or packed in ice for periods not exceeding 12 hours. When this is difficult, contact Lab for advice.

The ***faecal coliform test*** requires incubation for 24 hours, so sample results will be available within 36 hours from time of delivery to the lab.

SURFACE WATER - creek or spring

The sampling procedure for dam, creek or other stored water is to hold the jar firmly, hands away from the lip, quickly dunk the upturned jar under the surface of the water pointing it upstream (to avoid collecting the surface scum). Turn the jar upright to fill and quickly remove it from water body.

Tip out a small quantity (fill to the screw thread), cap securely, ensure sample jar is correctly labelled and dispatch to Lanfax Labs. Keep sample on ice when travel exceeds 30 minutes.

NOTE: Where animals are allowed free access to water resources, or where runoff from pasture occurs, it is most probable that the water will have faecal coliforms present. Another source of water should be selected.

INTERPRETING THE RESULTS

The *Australian Drinking Water Guidelines* state that water for human consumption "no sample should contain any thermotolerant (faecal) coliform organisms". Since the standard test is based upon 100 mL, here should be no coliforms in the 100 mL sample. A sample with this result will be reported as "<1 cfu/100 mL".

The total coliform count should also be less than one, but some coliforms are soil related and not pathogenic indicators.

PROTECTION OF WATER SUPPLIES

The most common method for protecting your water supply is to use barriers to prevent animals or animal manures entering the water supply. Dust from animal yards, birds and rats on rooftops can all lead to faecal coliform contamination. Septic tanks leaking into groundwater is a common problem. Surface waters (dams, creeks and springs) can become quickly fouled by native and domestic stock.

Maintain a vigilance over your water supply. An appropriate filter (about 5 micron or less) on your drinking water will minimise, but not exclude, the levels of some bacteria, protozoa and algae that may cause problems.

Drink only from water sources you know to be clean.

Cost = $81.60 (incl GST) per sample (routine test)