

BACTERIOLOGICAL ANALYSIS

Evaluation of the bacteriological quality of drinking water is done using "coliform" testing. Coliform bacteria are found in the intestinal tract of warm-blooded animals, surface water, some soils, and decaying vegetation. Coliform bacteria are used as "indicator" organisms. If they are present, pathogenic, or disease-causing organisms, could be present. The Michigan Department of Environmental Quality (DEQ) laboratory and many private laboratories use the "defined substrate method." A positive result may indicate that a water supply is not properly protected from contamination. The "defined substrate method" also detects *E. coli*, an organism that always originates from mammal or bird intestinal tracts. If *E. coli* is detected, it is more likely that the water supply may contain disease-causing organisms resulting from fecal contamination.

RESULTS OF COLIFORM ANALYSIS

Result Code

This means:

ND

"Not Detected" – No coliform organisms were detected in the water sample. The sample met the state drinking water standard for bacteriological quality at the time of sampling. (Similar results may be reported as negative; absent; or zero, "0.")

POS

"Positive" – Coliform organisms were present in the water sample. Safety cannot be assured. Collection of a resample to confirm the original result is recommended. An investigation into the cause of the problem by a qualified individual is advised. (Similar results may be reported as present or any number from 1 to 200.)

EC-POS

"*E. coli* detected" – *E. coli* organisms were detected in the water sample. *E. coli* organisms are found in the intestines of warm-blooded animals, and as such, their presence in a water supply is considered an indication of sewage contamination. Precautions are recommended in the use of the water supply. These results are the same as fecal coliform positive; however, *E. coli* results indicate sewage contamination with more certainty.

COMMENTS

Coliform organisms may die during sample holding time (time from collection to testing). The laboratory will comment that results may not be representative/valid if sample holding time is longer than 48 hours. The federal standard for a coliform holding time limit for public water supplies is 30 hours.

PARTIAL CHEMICAL ANALYSIS

The DEQ laboratory analyzes eight commonly requested parameters in a routine procedure called a "partial chemical analysis." Below are two tables of these parameters and associated problems. Table I lists three parameters where the USEPA and the state of Michigan have established drinking water health advisory levels for public water supplies. Parameters listed in Table II are associated with aesthetic water quality problems.

Test results are reported in milligrams per liter (mg/l).

Test	Good	Satisfactory	Caution	Problem
Nitrate as Nitrogen	ND to 3	4 to 10	Over 10 ¹	Methemoglobinemia ^{2,3} (blue baby) esp. infants.
Nitrite as Nitrogen	ND to 0.3	0.4 to 1	Over 1 ¹	Methemoglobinemia ^{2,3} (blue baby) esp. infants.
Fluoride	0.7 to 1.2 ⁴	ND to 0.7 or 1.2 to 4	Over 4 ⁵	Low levels are beneficial in preventing tooth decay. High levels may cause mottling of enamel.

TABLE I I

Test	Good	Satisfactory	Caution	Problem
Chloride	ND to 20	20 to 250	Over 250	Taste, corrosion.
Hardness	50 to 125	125 to 250	Over 250	Scaling of water fixtures, soap scum at high levels, corrosion at low levels.
Iron	ND to 0.2	0.2 to 0.3	Over 0.3	Staining, turbidity, taste, odor.
Sodium	ND to 20	Special diets may require water of low sodium content. Persons on severely restricted sodium diets should consult with their physician regarding continued use of the water supply. Acceptability of sodium concentration varies with sensitivity to taste.		
Sulfate	ND to 50	50 to 250	Over 250 Over 500	Taste, odor, scaling in boilers & heat exchangers. May have laxative effect especially for new supply users (traveler's diarrhea).

¹ USEPA drinking water standard


² See DEQ pamphlet EQCC2033 "Nitrate in Drinking Water" 2000

³ USEPA requires analysis within 48 hours

⁴ USEPA requires analysis within 48 hours

⁵ Optimal range of fluoride concentration per American Dental Association

⁶ USEPA drinking water standard is 4.0 mg/L for the state of Michigan



WATER SAMPLING TIPS

- ✓ Use a clean, indoor faucet.
- ✓ Try to avoid threaded taps, leaky or swing-type faucets.
- ✓ Do not use a dirty or contaminated tap.
- ✓ Do not sample through a hose or treatment device.
- ✓ Always sample the cold water.
- ✓ Allow the water to run in a steady stream at least 5 minutes before collecting the sample or until the pump runs.
- ✓ Do not set the bottle cap down.
- ✓ Do not touch the inside of the cap or bottle.
- ✓ Do not allow the cap or bottle to touch the faucet.
- ✓ Do not rinse the bottle.
- ✓ Maintain a steady low-flow stream.
- ✓ Fill the container to the fill line. Do not overfill.
- ✓ Seal the container as soon as it is filled.
- ✓ Enclose submission slip and proper payment with sample.
- ✓ Send/transport samples to the lab the same day of collection and early in the week.



A WORD OF CAUTION...

Unless your water well is properly designed, constructed, and maintained, a test result conforming to state standards may give you a false sense of security. A defective well can produce intermittent satisfactory bacteriological tests, but its continued safety cannot be assured.

While coliform bacteria and partial chemical testing are good screening tools, they do not detect petroleum products, industrial solvents, heavy metals, herbicides and pesticides. More complex and expensive testing may be appropriate for your site. Your local health department can assist you in deciding what type of testing is needed.

For further information contact your local health department or the Michigan Department of Environmental Quality Drinking Water & Radiological Protection Division Ground Water Supply Section
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Internet address: www.deq.state.mi.us/dwr

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UNDERSTANDING YOUR DRINKING WATER SAMPLE RESULTS

