



## Avalon Institute of Applied Science, Inc.

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### DO YOU KNOW THE WATER IN YOUR COMMUNITY?

Sending water samples to testing labs, and filing the required chlorination reports has become routine practice for the operators of municipal water treatment plants. However, do you *really know* the water in your community?

Here are some surprising facts.

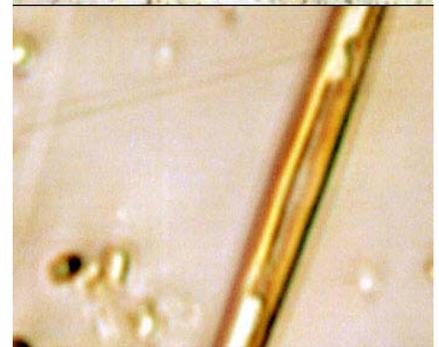
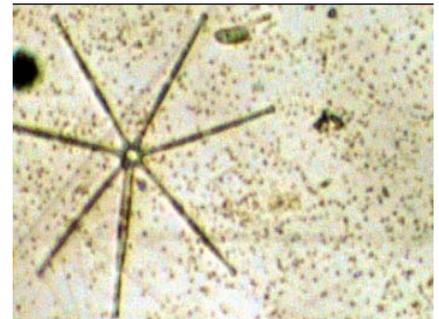
**1. FACT:** *If the water that is processed in your water plant is surface water, it may contain some unexpected “wildlife”, such as the one shown to the right.*

Our Institute is able to analyse the natural mixture of organisms referred to as the biological assembly. We are very well equipped for this task. We know how to culture single-celled organisms for analysis, and we can tell you whether the natural biological assembly of your water is an indicator of pristine water, or an indicator of pollution.

Manitoba, and to a certain extent Saskatchewan as well, hold the national record on shigellosis, an intestinal disease caused by the bacterium *Shigella*, as per statistics of Health Canada. The incidence rate is about ten times the national average. Shigellosis is an indicator disease for the spreading of intestinal bacteria into water supplies.

**2. FACT:** *If the water that is processed in your water plant is groundwater, it may also contain some unexpected “wildlife”, different from that seen in surface water.*

We have seen diatom algae in groundwater, as well as iron bacteria, and we can test for the presence of either one. Many bacteria can use iron or other metals in their metabolism. The flowing well water delivers so much food for these bacteria that they thrive. From the bacterial perspective, it is paradise, but from a human perspective, it is extremely annoying because it causes clogging of wells. Our Institute has experience with advanced disinfection technology that your community may consider. If well disinfection is required, we often recommend treatment with chlorine dioxide as a safer and more efficient way, compared with the commonly used shock chlorination.



**3. *FACT: Water often exceeds legal limits of disinfection byproducts.***

Chlorination is the predominant disinfection technology, especially with water containing organic components, or even complete organisms such as those shown in the previous pictures. Chlorination does not provide sufficient protection. Chlorine reacts with the organic parts and forms various chlorinated compounds, some of which are strictly regulated. However, it is very difficult, and often impossible, to stay within legal limits. Quite often, the “liquid chlorine” (hypochlorite solution) already comes from the manufacturer with components that are regulated. Our Institute can analyse the effect of advanced disinfectants on your water, and can analyse the hypochlorite solution that you receive from your vendor for the presence of unacceptable byproducts.

**4. *FACT: Water is often coloured by iron ..... manganese ..... humic substances .....***

Don't be too sure. If your test lab found manganese in the water, that does not mean that it colours the water, because we also found non-staining manganese colloid in wells in the prairies. The colour may also come from microorganisms, quite often neglected as a possible source of colour. Our labs are well equipped for a thorough analysis of your colour problem. We will find the reason.

**5. *FACT: Well water often contains ammonia and phosphate.***

Have you been told that this is natural, that it is a property of your aquifer? The geology of most of Canada makes it very unlikely that ammonia and/or phosphate can be found in an aquifer. It is an indicator of infiltration, i.e. of the pollution of the aquifer with surface water. The chemical pollution is always accompanied by pollution with bacteria. Our Institute has the hydrogeological experts that can identify the infiltration point and help you solve the pollution problem.

**6. *FACT: Many people just accept the bad taste of chlorinated tap water.***

There is no need to accept this bad taste as a fact of life. Our Institute can test your water for the feasibility to apply advanced disinfection technology.

### **About the Avalon Institute**

The Avalon Institute of Applied Science Inc. is a private academic institution that specialises in RESEARCH and CONSULTING in Environmental Sciences, Geological Sciences, Biological Sciences, Biotechnology, Engineering, Automation Systems and Information Technologies for the benefit of the environment, human health and welfare.

The Avalon Institute was established in 1999 in Winnipeg, Manitoba, Canada, as a successor to Anamet Scientific Services Ltd. in Tel Aviv, Israel. The Avalon Institute works with a core staff based in Winnipeg, Manitoba, and has built up a network of international specialists from around the world. All of the specialists in our network are distinguished professionals, with a long history of successfully completed projects, and most of our specialists maintain their individual positions as professors of universities.

One of the Institute's most significant academic accomplishments was the execution of a grant awarded by UNESCO for a major research project (2005-2009) in Europe.