

Analysis of water

Water chemistry analyses are carried out to identify and quantify the chemical components and properties of water samples. The type and sensitivity of the analysis depends on the purpose of the analysis and the anticipated use of the water. Chemical water analysis is carried out on water used in industrial processes, on waste-water stream, on rivers and stream, on rainfall and on the sea.^[1] In all cases the results of the analysis provides information that can be used to make decisions or to provide re-assurance that conditions are as expected. The analytical parameters selected are chosen to be appropriate for the decision making process or to establish acceptable normality. Water chemistry analysis is often the groundwork of studies of [water quality](#), [pollution](#), [hydrology](#) and [geothermal waters](#). Analytical methods routinely used can detect and measure all the natural elements and their inorganic compounds and a very wide range of organic chemical species using methods such as [gas chromatography](#) and [mass spectrometry](#). In water treatment plants producing drinking water and in some industrial processes using products with distinctive taste and odours, specialised [organoleptic](#) methods may be used to detect smells at very low concentrations.

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TWO ASPECTS OF WATER

There are two aspects of water analysis that we need to consider:

what substances or organisms are we interested in testing for-- and why?

what procedures and equipment do we use to make the measurements, and how do they work?

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Pure water, also known as purified water, is water from a source that has removed all impurities. Distilled water is the most common form of pure water. Pure water can be purified by carbon filtration, micro-porous filtration and ultraviolet oxidation.

Through purification, many types of impurities are removed, including Bacteria, Algae, Fungi, Parasites, Metals like copper and lead Chemical pollutants etc

Several methods are used to purify water commercially and in the home.

In most Western countries, public drinking water is purified to make water safe for human consumption. However, standards for drinking water around the world vary and are typically based on governmental regulations or international standards.

In fact, the World Health Organization estimates that over 2.1 billion people lack access to safe drinking water

To purify public drinking water, various treatment methods are used to make water safe, including

Coagulation and flocculation: Positively charged chemicals are added to water to bind with negatively charged particles so they can be filtered out. This forms larger particles called floc.

Sedimentation: Due to its larger size, floc settles to the bottom of the water supply, separated from the clean water.

Filtration: The clean water on top of the supply then flows through numerous filtration systems made of sand, charcoal and gravel. This removes contaminants like dust, bacteria, chemicals and viruses.

Disinfection: During this step, chemical disinfectants like chlorine are added to the water to kill any remaining bacteria or viruses that may have survived the first few steps.

It's important to note that water may be treated differently depending on the area and quality of the local water.

Potential Downfalls of Purified Water -

While purified water has many health benefits, it also has some potential drawbacks.

For example, fluoride is a mineral that is added to public drinking water supplies in some countries to improve dental health and reduce dental decay .

Although this practice has led to decreased tooth decay in children, especially in at-risk areas, some argue that fluoridated water is not worth the potential health risks associated with its use.

Excessive fluoride levels can be toxic to both brain and nerve cells, and long-term exposure to high levels of fluoride has been linked to learning, memory and cognitive deficits.

However, experts argue that the level of fluoride found in drinking water is safe and beneficial in reducing tooth decay, especially in children who are only exposed to fluoride through drinking water.

Research on the safety and efficacy of fluoridated water is ongoing, but those who drink purified water should be aware that some purification systems remove fluoride from drinking water.

Some other disadvantages of purified water include:

- **Upkeep:** Water purification systems must be maintained regularly. If not properly maintained, contaminants can build up in old filters and leach into your drinking water.
- **May not remove some contaminants:** Although water purification systems remove many contaminants, certain pesticides and chemicals may remain in purified water depending on the type of purification used.
- **Cost:** Both installing an in-home water purification system and buying purified bottled water can be expensive, with some systems costing hundreds of dollars.
- **Waste:** Buying purified water in plastic bottles leads to a large amount of waste, as does disposing of used filters from in-home purification systems.

SUMMARY : Water purification may not remove all contaminants from drinking water, and certain purification systems can be costly and involve upkeep. Certain purification methods remove fluoride, a mineral added to drinking water to improve dental health.

Sources of Water Contamination –

Water contamination comes from three primary sources:

Rainwater: It is usually safe to drink, but rainwater has become increasingly contaminated due to air pollution in various areas of the world.

Surface water: Storm water runoff can pollute rivers, streams and lakes, and much of the contamination comes from agriculture and industry.

Groundwater: Water from underground aquifers is usually safe to drink, but over the past few years contamination has increased. Water that is deep underground is more protected from many types of contamination. Geology and soil makeup also affect water quality. Groundwater may be contaminated by naturally occurring elements like arsenic, selenium or boron.

There are a number of threats to drinking water: Improperly disposed of chemicals, animal wastes, pesticides, human wastes, wastes injected deep underground and naturally occurring substances all can contaminate drinking water. Likewise, drinking water that is not properly treated or disinfected, or that travels through an improperly maintained distribution system, also may pose a health risk.

Categories of Water Contaminants

Water contaminants fall into four basic categories:

Aesthetic: Offensive tastes and odors that come from natural and unnatural sources; sediment, dirt, sand or particulates that affect taste; and minerals that affect taste and can become a nuisance for plumbing fixtures;

Biological: Pathogens that have serious or deadly effects on human health, including bacteria (such as E. coli, Salmonella, Shigella and Legionella), cysts and parasites (such as Giardia, Cryptosporidium and tapeworms), and viruses (such as hepatitis A and poliovirus);

Chemical: Volatile organic compounds, chlorine, chloramines, pesticides, herbicides, and inorganic chemicals, such as nitrates; and

Dissolved solids: Minerals (such as calcium and magnesium) and heavy metals (such as iron, manganese, lead, mercury, cadmium, chromium, arsenic, aluminum, copper, radon and barium).

Water Sampling - The process of taking a portion of water for analysis or other testing, e.g. drinking water to check that it complies with relevant water quality standards, or river water to check for pollutants, or bathing water to check that it is safe for bathing, or intrusive water in a building to identify its source.

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Water purification methods -



In a country where waterborne diseases result in over 10,000 deaths annually, we don't need to emphasize why there is an urgent need for a water purifier in every household. While higher authorities might be doing their best to provide us with clean and safe drinking water, we too have a responsibility. We need to ensure that our homes and workplaces are fitted with an electric water purifier for safe and clean water. Most people trust an RO Filter or an RO UV Water Purifier for their drinking water needs, but there are other alternative methods that you can try. Here are some of the most effective water purification methods that have stood the test of time:

1. **Boiling**

The simplest method to purify water is to boil it for a good amount of time. High temperatures cause the bacteria and virus to dissipate, removing all impurities from the water. In doing so, chemical additions cease to exist in the water as well. However, the dead micro-organisms and impurities settle at the bottom of the water, and boiling does not help eliminate all the impurities. You must strain the water through a microporous sieve to completely get rid of the impurities.

2. **Water Purifier**

Alt Attribute: A. O. Smith X4+ Water Purifier

An electric water purifier is the most trusted form of water purification that can be found in most houses today. A water purifier uses a multi-stage process that involves UV and UF filtration, carbon block, and modern water filtration technology that eliminates a majority of the chemicals and impurities making it the purest drinking water.

3. **Reverse Osmosis**

An RO Purifier proves to be one of the best methods of purifying water. Reverse Osmosis forces water through a semipermeable membrane and removes contaminants. The TDS Controller and Mineraliser Technology like the one found in an A. O. Smith RO UV Water Purifier help retain the necessary nutrients while doing away with harmful impurities.

4. **Water Chlorination**

This is an older technique used usually during an emergency, wherein a mild bleach with approximately 5% chlorine is added to the water. This mixture works as an oxidant and quickly kills microorganisms, making water safe for consumption.

5. **Distillation**

Distillation is a water purification process that involves collecting the condensed water after evaporation, which ensures that water is free of contaminants. However, this isn't as effective as an RO filter because it is time-consuming and eliminates minerals as well.

6. Iodine Addition

Iodine is a red chemical that is easily available as a tablet or a liquid. It is extremely powerful as it kills bacteria and viruses. However, it adds an unpleasant taste and can be fatal if taken in high doses. Therefore, it should only be used if you don't have access to a better method of purification like an electric water purifier.

7. Solar Purification

An alternative to the UV filtration is solar purification which involves treating water with the ultraviolet radiation of the sun. The process involves filling a plastic bottle with water, shaking it to activate the oxygen and leaving it horizontally in the sunlight. This effectively kills bacteria and viruses present in the water, making it safe for consumption.

8. Clay Vessel Filtration

Way before people had access to an RO or UV Purifier, they used clay pots which purified muddy water, by blocking out the mud and allowing pure, potable water to pass through. This method is still used in some rural regions.

9. UV Radiation

Water is exposed to a UV Light that kills microorganisms, thereby preventing it from breeding further. But if not coupled with an RO Filter, UV Radiation alone cannot remove impurities and heavy metals.

10. Desalination

This method is used when water with a certain level of salinity needs to be filtered. This process is helpful for eliminating salt content, but it also removes essential minerals. Desalination is not considered to be as effective as modern water purification methods.

Water purifiers are essential to every home. It is pretty evident that a UV RO Water Purifier is probably the most effective of all purification methods. With an increase in deadly diseases, it has become imperative to invest in a water purifier that ensures clean water for consumption. In the event of a water purifier not being accessible, the above methods should be used. Safe drinking water for children with A. O. Smith baby safe RO Green water purifier series is necessary to avoid the risk of waterborne illnesses. Find a suitable water purifier for your home and keep your family safe.

