

Disinfection ByProducts from Chlorinated Water

If you have not heard of DBPs before, you need to pay close attention as it turns out that DBPs, not chlorine, are responsible for nearly all the toxic effects of chlorinated water. Chlorine by itself is relatively harmless, but its side effects, by producing DBPs, is what causes nearly all of the problems.

As it turns out, DBPs are over **10,000 times more toxic than chlorine**, and out of all the other toxins and contaminations present in your water, such as fluoride and miscellaneous pharmaceutical drugs, DBPs may be the absolute worst of the bunch.

Enormously Important to Know

Unfortunately, few people are aware of this toxic threat, and those who are aware may still not realize that not all water filtration systems are capable of filtering out DBPs. In fact, there is currently no point-of-entry, whole-house water filtration system that is *certified* to filter out these toxins.

If you fail to understand this fact, it is virtually impossible to make a wise choice when selecting how you filter your drinking water. There is a high likelihood you are unaware of this, and the deceptive marketing of the industry may lead you to make choices that are actually NOT protecting you and your family.

How are Disinfection Byproducts Created?

The most common disinfection techniques used at water treatment facilities today involve the use of chlorine, chloramines, and chlorine dioxide to kill harmful, disease-causing microorganisms in the water, making it safe to drink.

Unfortunately, over the years scientists have discovered that toxic chemical byproducts form when these disinfectants react with natural organic matter like decaying vegetation in the source water.

The most common disinfectant byproducts formed when chlorine is used are:

- trihalomethanes (THMs)
- haloacetic acids (HAAs)

The EPA takes the dangers of THMs -- which are measured in parts per *billion* -- very seriously and regulates these compounds. The maximum annual average of THMs in your local water supply cannot exceed 80 ppb (parts-per-billion), and the maximum annual average of HAAs permitted by EPA regulations is 60 ppb.

However even though these are allowed, ideally it would be best to have zero. These levels have been regularly adjusted downwards over the years as science progresses and gains a deeper appreciation of their true toxicity.

As usual, cost is one reason -- and probably the sole reason -- water companies managed to prevent this EPA standard from being reduced even further. Water companies felt it would cost too much to remove a greater amount of these DBPs from their water, so they pushed for an elevated standard.

Nevertheless, it's important to note that the EPA sets the goal for some of these byproducts at **zero** because they are so dangerous, but unfortunately the EPA goal would be impossible to enforce.

Hence, if you are on a public water system -- meaning a utility company supplies your water -- it's extremely likely it contains chlorine and disinfection-byproducts and you will definitely want to consider purifying your family's water with a water filtration system that can effectively remove DBPs. Slovak recommends requesting a water quality report from your local water purveyor at least once a year, to see how well your municipality maintains the EPA standards. Keep in mind however that the EPA's recommended goal is zero! So if your municipality is on the high end, your water may be more hazardous than you'd like to imagine.

If you are like me and obtain your water from a private well, then DBPs are a non-issue as they are only produced when chlorine is added, and it's highly unusual to add chlorine to most all private well water systems.

How Can DBPs Harm Your Health?

Trihalomethanes (THMs) are Cancer Group B carcinogens, meaning they've been shown to cause cancer in laboratory animals.

DBPs have also been linked to reproductive problems in both animals and humans, and human studies suggest that lifetime consumption of chlorine-treated water can more than double the risk of bladder and rectal cancers in certain individuals.

One such [study](#) found that smoking men who drank chlorinated tap water for more than 40 years faced double the risk of bladder cancer compared with smoking men who drank non-chlorinated water.

A second [study](#) found that rates for rectal cancers for both sexes escalated with duration of consumption of chlorinated water. Individuals on low-fiber diets who also drank chlorinated water for over 40 years more than doubled their risk for rectal cancer, compared with lifetime drinkers of non-chlorinated water.

As the vast majority of the U.S. population continues to receive and consume disinfected or chlorinated drinking water, we can assume that Americans are consuming disinfection byproducts every single day, and the number of related cancer cases could be substantial.

DBPs are Even More Dangerous Through Skin Exposure!

As bad as it is to consume DBPs, they may wreak even more havoc when they're absorbed through your skin!

A [study](#) published in the *Journal of Environmental Sciences* last year found that swimming in a chlorinated pool presented *an unacceptable cancer risk*.

They concluded that the cancer risk of trihalomethanes from various routes in descending order was:

1. skin exposure while swimming
2. gastro-intestinal exposure from tap water intake
3. skin exposure to tap water
4. gastro-intestinal exposure while swimming

But the cancer risk from skin exposure while swimming was over 94 percent of the total cancer risk resulting from being exposed to THMs!

THMs formed in chlorinated swimming pools have also been [linked to spontaneous abortion, stillbirths and congenital malformations](#), even at lower levels.

This is one of the primary reasons I rarely ever dip in a pool. I far prefer to swim in a lake or the ocean.

The ocean is my favorite, and fortunately I get to do that regularly when I am in Maui over the winter. It always surprises me though how few people swim in the ocean, relative to spending their time in the pool right next to the ocean. Seems

people would rather soak up these dangerous DBP toxins than swimming in natural healthy salt water.

Other Dangers in Your Drinking Water

As reported in *New Scientist*, a comprehensive survey of U.S. drinking water reveals that your drinking water is also likely laced with a wide variety of pharmaceuticals and hormonally active chemicals.

The 11 most frequently detected compounds were:

- **Atenolol**, a beta-blocker used to treat cardiovascular disease
- **Atrazine**, an organic herbicide banned in the European Union which has been implicated in the decline of fish stocks and in changes in animal behavior
- **Carbamazepine**, a mood-stabilizing drug used to treat bipolar disorder
- **Estrone**, an estrogen hormone secreted by the ovaries and blamed for causing gender changes in fish
- **Gemfibrozil**, an anti-cholesterol drug
- **Meprobamate**, a tranquilizer used in psychiatric treatment
- **Naproxen**, a painkiller and anti-inflammatory linked to increases in asthma incidence
- **Phenytoin**, an anticonvulsant used to treat epilepsy
- **Sulfamethoxazole**, an antibiotic
- **TCEP**, a reducing agent used in molecular biology
- **Trimethoprim**, another antibiotic

So, What are Your Healthiest Water Options?

Your best bet for ensuring your water does not contain DBPs and various pharmaceutical agents is to filter your own water, at home, using a reverse osmosis filter.

While installing a filter to purify your drinking water is a wise decision as it will eliminate virtually all of the drugs and DBPs, it may not be enough. Your skin absorbs both water *and* chemicals -- as illustrated in the study on swimming pool contamination and cancer risk mentioned above -- so you could still be exposing yourself to dangerous levels of contaminants when you:

1. Shower or bathe
2. Wash your hands
3. Wash laundry
4. Rinse fruits and vegetables

5. Wash dishes, glasses, and other utensils

The biggest risk here is your shower. You can easily absorb as many toxins in one shower as you would by drinking tap water all week long.