

The dirt on toxic chemicals in household cleaning products



There is no requirement in Canada for manufacturers to warn consumers about the health and environmental hazards associated with chronic, or long-term, exposure to chemical ingredients in household cleaning products (Credit: Jenny Lee Silver).

Canadians spend more than [\\$275 million](#) on household cleaning products in a year. We buy these products to fight germs, streaks, stains and odours to keep our homes sparkling clean. Cleaning is supposed to be about maintaining a healthy home, yet some common household cleaning products contain chemicals that can harm human health and the environment. What a mess.

Acute and chronic effects

You're probably familiar with the hazard symbols that appear on some cleaning products, along with word like "poison", "corrosive" or "irritant."

These [hazard symbols](#) warn consumers about acute health hazards associated with a single or short-term exposure to chemicals in the product.

But there is no parallel requirement in Canada for manufacturers to warn consumers about the health and environmental hazards associated with chronic, or long-term, exposure to chemical ingredients in household cleaning products. Most of us are exposed to cleaning products and their residues at low levels on a daily basis.

When we use these chemicals to clean our home, they linger in the air and we breathe them in. Researchers in the U.S. identified 133 unique volatile organic compounds (VOCs) emitted from a small sample of consumer products, including six cleaning products. Each product tested emitted between one and eight chemicals classified as toxic or hazardous under U.S. federal laws.

Chemicals in cleaning products can also enter our bodies by absorption through the skin or through ingestion of household dust and chemical residues left on dishes and cutlery. And when cleaning products are flushed down the drain, they can have a serious impact on aquatic ecosystems.

There is no regulatory requirement for ingredients to be listed on the label in a consistent format, so it can be hard to identify chemicals of concern. Here's the dirt on some hazards that may be hiding in your cleaning closet:

2-Butoxyethanol (2-BE, also known as butyl cellosolve)

A skin and eye irritant also associated with blood disorders. In laboratory experiments, exposure to high doses of 2-BE has been shown to cause reproductive problems. This chemical is listed as a toxic substance under the Canadian Environmental Protection Act on the basis that it is harmful to human health. Health Canada identified indoor air and skin contact with cleaning products as the main pathways of exposure. Regulations limit the concentration of 2-BE in most household cleaners to 5 or 6 per cent, but higher concentrations are permitted in other products, notably and laundry stain removers (up to 22 per cent).

Found in: *glass cleaners, laundry stain removers, carpet cleaners, automobile cleaners, windshield wiper fluid, degreasers, oven cleaners, and rust removers.*

Ammonia

Vapours may irritate the skin, eyes, throat, and lungs. People with asthma may be particularly sensitive to the effects of breathing ammonia. Ammonia may also cause kidney and liver damage. While ammonia also occurs naturally, the use of cleaning products containing this substance can result in higher levels of exposure to vapours than from natural sources. If ammonia is mixed with products containing chlorine bleach (sodium hypochlorite), highly poisonous chloramine gas is formed.

Found in: *window cleaners, drain cleaners, toilet cleaners, bathroom cleaners, oven cleaners, stainless-steel cleaners, car polish, and all-purpose cleaners.*

Coal tar dyes

Derived from petrochemicals, and may be contaminated with trace amounts of heavy metals like arsenic, cadmium and lead. There is concern that synthetic dyes may cause cancer and that heavy metals can harm the nervous system and cause other adverse health effects. Dyes in cleaning products can be absorbed

through the skin or ingested in the case of soap residue on dishes. They are completely unnecessary to the cleaning function of the product.

Found in: *most types of cleaning products.*

MEA (monoethanolamine), DEA (diethanolamine), TEA(triethanolamine)

Can react with nitrites to form carcinogenic nitrosamines. Nitrites may be present as preservatives or contaminants in other products, or in some water sources. These ethoxylated alcohols may also be contaminated with 1,4-dioxane, a possible human carcinogen that is persistent in the environment. 1,4-dioxane can be removed during the manufacturing process, but there is no easy way to know if that has occurred. DEA is a mild skin and severe eye irritant. MEA is known to induce asthma in workplace settings.

Found in: *liquid laundry detergents, all-purpose cleaners, floor cleaners, car wash products, degreasers, dishes soap, oven cleaners, and glass and surface cleaners.*

Fragrance chemicals

More than 3000 chemicals are used in fragrance mixtures. Many are irritants and can trigger allergies, migraines, and asthma symptoms. In addition, **synthetic musks** used in detergents build up in the environment and can be toxic to aquatic organisms. Certain synthetic musks are also suspected endocrine disrupters that mimic or interfere with the function of hormones. Phthalates are another common fragrance ingredient in products such as laundry detergents, fabric softeners and deodorizers. Glass cleaners and floor polishes have also been found to contain dibutyl phthalate (DBP). **Phthalates** are suspected endocrine disrupters associated with reproductive effects, including reduced sperm count in men. The European Union classifies DBP as very toxic to aquatic organisms. Under the Convention for the Protection of the Marine Environment of the North-East Atlantic, DBP is listed as a Chemical for Priority Action. Air fresheners contain a potpourri of fragrance chemicals, in some cases including cancer-causing benzene and formaldehyde, as well as phthalates and numerous VOCs. [See also...](#)

Found in: *most types of cleaning products.*

Nonylphenol ethoxylates (NPEs)

Degrade into nonylphenols (NPs), which can mimic the hormone estrogen. In laboratory experiments, NP has been shown to stimulate the growth of human breast cancer cells and cause adverse reproductive effects in fish and other aquatic organisms. Several chemicals in this class are listed as toxic substances under the Canadian Environmental Protection Act. Environment Canada required companies to develop plans to reduce NPEs in cleaning products (as well as textiles and pulp and paper products) by 95 per cent by the end of 2010, but stopped short of banning these chemicals. As of July 2010, only 63 per cent of

manufacturing facilities subject to the planning requirement had met the target, although the use of these chemicals in products has declined significantly.

Found in: *liquid laundry detergents, stain removers, all-purpose cleaners, air fresheners, toilet bowl cleaners, degreasers, and car wash products.*

Phosphates

Function as a fertilizer in water. High concentrations of phosphates in bodies of water can promote harmful algal blooms and increase weed growth. This can cause oxygen levels in the water to decline, potentially killing fish. Excess algal growth can also plug filtration devices at water treatment facilities and affect the taste and odor of the water, resulting in increased costs of water purification. Certain algal blooms produce chemicals that are toxic to animals and people who drink the water. New regulations took effect in 2010 that limit phosphorus concentration in household cleaning products to 0.5 per cent — a big improvement. But why not opt for phosphate-free brands?

Found in: *dishwasher detergents, laundry detergents, and bathroom cleaners.*

Quaternary Ammonium Compounds (Quats)

Irritants and sensitizers that can induce an allergic response following contact with the skin. Quats are also known to cause occupational asthma in cleaning workers and preliminary evidence indicates they may cause adverse genetic and reproductive effects. Chemicals in this class are persistent in the environment and toxic to aquatic organisms. Like triclosan, quats are anti-microbial agents and there is concern that their widespread use in household disinfectants and cosmetics is contributing to antibiotic resistant bacteria, thus limiting treatment options for microbial infections. The Canadian Medical Association has [called for a ban](#) on antibacterial consumer products.

Found in: *bathroom cleaning products, all-purpose cleaners, fabric softeners, and degreasers.*

Silica powder

Rated by the International Agency for Research on Cancer as a known human carcinogen. This natural ingredient (made from finely ground quartz) is hazardous as a dust if inhaled.

Found in: *abrasive cleaning powders.*

Sodium dichloroisocyanurate dihydrate

Corrosive; severe eye, skin and respiratory irritant. It can also form chlorine gas, which will burn the eyes, nose and mouth. Studies have found that high doses of this chemical cause kidney damage. In its

concentrated form, this chemical is very toxic to aquatic organisms and may cause long-term effects in aquatic ecosystems.

Found in: *toilet bowl cleaners, deodorizers, surface cleaners, and disinfectants*

Sodium hydroxide (also known as lye and caustic soda)

Highly corrosive; can burn the eyes, skin and lungs and is a respiratory irritant. Long-term exposure in the air may lead to ulceration of the nasal passages and chronic skin irritation. If discharged in large quantities, sodium hydroxide can alter the pH of water. In 2005, a large spill of concentrated sodium hydroxide in the Cheakamus River canyon, north of Squamish, B.C., killed virtually all the fish in the river.

Found in: *oven cleaners, bathroom cleaners, disinfectants, drain openers, and toilet bowl cleaners*

Sodium lauryl sulfate (SLS) and sodium laureth sulfate (SLES)

Sodium lauryl sulfate is a skin irritant and Environment Canada's preliminary categorization of this chemical indicates that it may be toxic to the environment. Sodium laureth sulfate is the "ethoxylated" form of this chemical, which is less harsh. However, the process of ethoxylation can leave behind traces of 1,4-dioxane, a possible human carcinogen that is persistent in the environment (see also DEA, MEA, TEA).

Found in: *dish soap, liquid laundry detergents, cleaning towelettes, and toilet bowl cleaners (as well as sudsy [cosmetics](#)).*

Triclosan

Toxic and a suspected endocrine disrupter that can mimic or interfere with the function of hormones. The European Union classifies triclosan as irritating to the skin and eyes, and as very toxic to aquatic organisms, noting that it may cause long-term adverse effects in the aquatic environment. Triclosan can also react in the environment to form dioxins, which bioaccumulate and are toxic. Triclosan is an anti-microbial agent and there is concern that its extensive use in consumer products is [contributing to antibiotic-resistant bacteria](#), thus limiting treatment options for microbial infections. The Canadian Medical Association has [called for a ban on antibacterial consumer products](#).

Found in: *dish soaps and disinfectants, as well as a wide range of [other household products](#). Look for it listed as an "active ingredient" in antibacterial products.*

Trisodium nitrilotriacetate

Rated by the International Agency for Research on Cancer as a possible human carcinogen. In an assessment of nitrilotriacetic acid (NTA), a related chemical that is analytically identical in solution, Health Canada concluded that the concentrations of NTA/trisodium nitrilotriacetate in drinking water are low enough that they don't constitute a danger in Canada to human health when ingested. The problem is that individually small doses add up in the environment and contribute to our overall toxic burden. In aquatic ecosystems, trisodium nitrilotriacetate can also cause heavy metals in sediment to redissolve and many of these metals are toxic to fish and other wildlife.

Found in: *bathroom cleaners and possibly some laundry detergents (more common in industrial formulations).*

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