

Ingredient in Popular Disinfectant Wipes Linked to Reproductive Health Issues

Quaternary ammonium compounds, also referred to as “QACs” or “quats,” contribute to antimicrobial resistance, pollute the environment and are linked to several health issues, including reproductive dysfunction.

By [Dr. Joseph Mercola](#)

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Story at a glance:

- Quaternary ammonium compounds are also referred to as “QACs” or “quats.” They are a popular ingredient in disinfectant wipes, which Clorox increased production of to 1.5 million packs per day during the pandemic.
- One survey suggests 83% of households asked used disinfectant wipes at least one time in the previous week and 29% claimed to use them every day. Researchers found that the chemicals contribute to antimicrobial resistance, pollute the environment and are linked to several health issues.
- Serum concentrations of QACs rose from 2019 to 2020 in a sample of 111 participants; although school systems began using wipes to clean student desks after the return to school, the National Pesticide Information Center warns that children should not use disinfectant wipes due to exposure to toxins.
- A 2017 animal study revealed exposure to quats could have transgenerational effects in animals that were not exposed to the quats. Animals have also exhibited reproductive dysfunction after respiratory and contact exposure to QACs.
- A clean and decluttered home is a sanctuary from the outside world, but when you use harsh chemicals and rubber gloves to get the job done, you’re likely doing more harm than good. Instead, choose nontoxic and multiuse combinations to clean, deodorize and polish your home.

QACs are a broad class of several hundred chemicals and are commonly used in wood preservatives, mouthwash, detergents, shampoos, fabric softeners, eye drops and herbicides. QACs are largely used in the U.S.

While the [European Union](#) has not banned QACs, the regulating agency has set a very low maximum residue level of 0.01 mg per kilogram (mg/kg) for pesticides used on food or animal feed.

Applications in the U.S. range from industrial, clinical, domestic and agricultural. They can be measured in food production, households, facilities and medical settings.

According to data from the University of Massachusetts, some ready-to-use products, like disinfectant hand wipes, can contain up to 20% active [QAC ingredients](#) and industrial concentrations may contain up to 80% of the active ingredients.

Chemical industry claims safety testing is rigorous

In the [University of Massachusetts' review](#), they write that of the disinfectants approved by the [U.S. Environmental Protection Agency](#) (EPA) for use during the [COVID-19](#) pandemic, more than half are QAC-based.

After reviewing the hazards, the Toxics Use Reduction Institute Science Advisory Board recommended some of these chemicals be added to the list of toxic or hazardous substances and policy implications based on this analysis should be considered.

In mid-2020, at the start of the pandemic, researchers found [QAC was an active ingredient](#) in over 200 disinfectants recommended by the EPA. The researchers believed the amount of these compounds had increased and would likely continue to increase.

In the past QACs had been found in sediment, surface water and wastewater. These researchers believed that the elevated use of QACs was a reasonable response to the SARS-CoV-2 infection.

Some organizations, such as the [Chemical Safety Facts](#) website sponsored by the American Chemistry Council, boldly claim that the EPA and other authorities regulate disinfection products and that “quat-based ingredients undergo rigorous testing to determine that they will not have unreasonable adverse effects on human health and the environment when used as directed.”

Yet, that claim is not substantiated by the EPA or the Centers for Disease Control and Prevention (CDC). The CDC states, “A manufacturer must submit specific data about the safety and effectiveness of each product” and “With respect to disinfectants and sterilants, part of CDC’s role is ... to comment about their safety and efficacy.”

According to the [EPA website](#) they “register products that sanitize and disinfect.”

In other words, while the [chemical industry](#) would like consumers to believe the products sold on the grocery store shelves are regulated and safety tested, the reality is that the safety testing is done by the manufacturer and the data they choose is forwarded to the U.S. Food and Drug Administration (FDA), EPA or other regulating agency.

Chemicals in disinfectant wipes are dangerous and ineffective

Global use of disinfectant wipes rose dramatically during the pandemic. According to the 2021 annual report from just one company that produces wipes — [The Clorox Company](#) — to meet the demand for disinfectant wipes, they created a new production line that increased the total production capacity to 1.5 million packs per day, which the company anticipated ramping up even further.

A press release from an industry trade group published at nearly the same time claimed [83% of households](#) had used disinfectant wipes at least one time in the past week and 92% of consumers claim to use a cleaning, disinfecting or sanitizing wipe.

Not surprisingly, the same survey revealed 29% of people asked said they used a wipe-type product every day.

Although quats are a common ingredient in popular disinfectant wipes, a 2023 peer-reviewed paper published in [Environmental Science and Technology](#) revealed several disturbing facts.

The review of the literature was performed by a multi-institutional, multidisciplinary team of scientists from nonprofit, academic and governmental organizations.

They reviewed the available information on both human health and the environment from exposure to QACs.

As [The Guardian reported](#), the researchers found that chemicals contribute to antimicrobial resistance, pollute the environment and are linked to several health issues.

Strong proponents may argue that if they are effective, these issues may not be as severe as protecting human health against viruses and bacteria. However, the researchers also concluded that they are not particularly effective.

Among the health issues associated with [exposure to quats](#) are infertility, metabolic disruption, asthma, birth defects and skin disorders, The Guardian says.

These are a high price to pay to use disinfectant products that do not protect against the [spread of COVID-19](#) since it spreads through respiratory transmission.

A 2021 study published in [Environmental Science and Technology](#) looked at serum concentrations of QACs in 111 people.

The samples were collected in 2019 and again in 2020 during the pandemic. Researchers found serum levels were significantly higher in the samples collected in 2020 than in the prior samples.

According to the [National Pesticide Information Center](#), “Children should not apply antimicrobials, including disinfectant wipes,” because of the danger associated with quats.

Yet, as [The Guardian notes](#), children and teachers regularly used disinfectant wipes on classroom desks in a misguided effort to avoid COVID-19. Instead, children are being exposed to alarming levels of these dangerous chemicals.

Quats are popular chemicals in disinfectants and more

A 2023 paper in the [Journal of Hazardous Materials](#), called the use of disinfectant wipes containing QACs “of significant concern due to their overuse during this pandemic.”

Researchers found QACs rose by 331% at wastewater treatment plants when compared to levels before the pandemic.

Researchers also found a 62% increase in the concentration of [QACs](#) in residential dust, which leads to higher concentrations in human blood and breast milk.

They pointed out that in addition to toxicity to humans and the environment, quats also multiply

the threat of antimicrobial resistance.

While the rising contamination of the environment from quats throughout the pandemic was a result of the increased use of disinfectant wipes, disinfectant wipes are not the only [product containing quats](#).

Children and adults are exposed to these chemicals from multiple sources, including household and commercial [cleaning products](#) and personal care products.

QACs are positively charged ions that bind to the hair shaft. For this reason, they are included in shampoos and conditioners to give hair a slippery feel so fingers glide through the hair and there is less fly-away hair.

QACs are also used as preservatives in hand lotions and cosmetics. Among those are quaternium-15, polyquaternium-9 and cetyl pyridinium chloride, all of which are known to trigger contact dermatitis.

[Quaternium-15](#) is a known formaldehyde releaser and [formaldehyde](#) is carcinogenic with a high probability of causing cancer and a moderate risk of allergic reaction and immunotoxicity.

Exposure may have transgenerational effects

In 2017, a study published by [Virginia Tech and Washington State University](#) researchers demonstrated that exposure to chemicals that are commonly found in household and commercial cleaning products can lead to birth defects in an animal model.

The [Environmental Working Group](#) (EWG) believes the study is “particularly significant” since it is the first known analysis of the impact of combinations of quaternary ammonium compounds on embryos or fetuses.

In 2016, the same team of researchers published the results of a study in which they analyzed how exposure to a quats mixture may impair fertility.

In this [earlier animal model study](#), the researchers found that female and male mice exposed to quats exhibited reproductive dysfunction, including fewer ovulations and implantations, and decreased sperm concentration and motility.

Even ambient and low-dose exposures in male mice had a significant effect on sperm parameters.

Both studies analyzed alkyl dimethyl benzyl ammonium chloride and didecyl dimethyl ammonium chloride chemicals, which the EWG determined in 2017 were found in more than 170 products.

However, as the [EWG writes](#), “This is a conservative estimate given that many manufacturers may not list these ingredients at all.”

The EWG also notes, one of these products is [infant diapers](#), exposing our most vulnerable population.

In the 2017 study, the researchers exposed animals to a combination of consumption, respiratory and surface residues of the mixtures of disinfectants.

The EWG reported that the scientists found a 150% increase in the rate of [neural tube defects](#).

[Neural tube defects](#) are a type of abnormality found in the development of the spinal cord or brain.

They can manifest as spina bifida or damage to the development of the brain, such as anencephaly in which part of the brain is missing, encephalocele when there's an opening to the brain and the membranes or iniencephaly where the spine is exceptionally distorted.

Importantly, they found that respiratory and surface exposure had a greater impact on the development of neural tube defects than on deliberately feeding the animals the quats.

They also found that maternal exposure may also trigger transgenerational defects that persist even in animals that are not directly exposed.

In other words, female mice exposed to quats may deliver normal babies who then go on to deliver babies with neural tube defects even though they were not exposed to the quats.

The [researchers concluded](#):

“These results demonstrate that ADBAC+DDAC in combination are teratogenic to rodents. Given the increased use of these disinfectants, further evaluation of their safety in humans and their contribution to health and disease is essential.”

Cleaning creates as much damage as cigarettes

A 2018 study from the [University of Bergen](#) in Norway also demonstrated that using cleaning products once a week for 20 years may be the equivalent of smoking 20 cigarettes a day for 10 to 20 years.

The researchers were interested in the long-term effects that cleaning supplies had on health as much of the documented evidence has been on the short-term impact.

The study compared women who [cleaned weekly](#) and those who did not and found the forced vital capacity, or the amount of air a person can forcibly exhale after taking a deep breath, declined by 7.1 ml per year faster in women who worked as cleaners as compared to 4.3 ml per year in women who cleaned it home.

Senior study author [Dr. Cecilie Svanes](#) said in a statement:

“While the short-term effects of cleaning chemicals on asthma are becoming increasingly well documented, we lack knowledge of the long-term impact. We feared that such chemicals, by steadily causing a little damage to the airways day after day, year after year, might accelerate the rate of lung function decline that occurs with age.”

Nontoxic household cleaning products and multiuse agents

A clean and decluttered home is a sanctuary from the outside world, but when you use harsh chemicals and rubber gloves to get the job done, you're likely doing more harm than good.

The good news is you don't need to buy chemical cleansers to keep your home clean. With a few natural and nontoxic staples, you can save money and keep your house clean.

[Baking soda](#) is one of those staples. To prepare for the Statue of Liberty's 100th anniversary in 1986, crews were tasked with removing 99 years' worth of coal tar from the inner copper walls without damaging the structure.

More than 100 tons of baking soda was brought in to clean the statue, so there's a good chance it can remove the dirt and grime from around your house too.

Both lemon peel and juice are good for cleaning and deodorizing. Distilled white vinegar is another cleaning staple with a long history. It makes a good window cleaner and has disinfectant properties.

However, do not clean your shower walls with vinegar as it removes the grout sealer, which can let in water and damage the wall behind the tile.

Castile soap is natural, biodegradable and chemical-free and can be used for personal care, house cleaning and laundry.

For a list of ways to use these nontoxic products and more, see "[Top 8 Nontoxic Cleaners You Can Use at Home.](#)"

Originally published by [Mercola](#).

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