

The Intersection of Pesticides and the New Normal under Coronavirus

DISINFECTANTS ARE PESTICIDES: ADOPT DISINFECTING AND SANITIZING PRACTICES THAT PROTECT, RATHER THAN ELEVATE RISK FACTORS

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As the Novel Coronavirus Disease 2019 (Covid-19) kills and infects—over 11 million infected (nearly three million in the U.S.) and over 500,000 dead (over 132,000 in the U.S., at this writing and rising exponentially—people are looking for sound safety advice for themselves and their families. Disinfectants are registered by the U.S. Environmental Protection Agency (EPA) as toxic pesticides. Can safety from the virus be achieved without them?

While the Centers for Disease Control and Prevention (CDC) has offered preventive steps for washing hands, cleaning, sanitizing, and disinfecting with soap and water, EPA has allowed the market to be flooded with toxic products that public health officials cite as unnecessary to kill the coronavirus. Soap breaks down the membrane surrounding the virus, which then falls apart. The various toxic materials that are being promoted as sanitizers, as described below, increase people's vulnerability to the virus among those who have underlying health conditions, such as illnesses of the respiratory and immune system. Cleaning and disinfecting can reduce risk from pathogens, like coronavirus, but toxic chemical exposure can actually increase risk.

DEFINITIONS

CDC advises, "Cleaning is the necessary first step of any disinfection process. Cleaning removes organic matter, salts, and visible soils, all of which interfere with microbial inactivation. The physical action of scrubbing with detergents and surfactants and rinsing with water removes substantial numbers of microorganisms. If a surface is not cleaned first, the success of the disinfection process can be compromised. Removal of all visible blood and inorganic and organic matter can be as critical as the germicidal activity of the disinfecting agent."¹ [Emphasis added.]

In terms of materials, sanitizers, which are designed to be used on humans, are distinguished from disinfectants, which are used on inanimate surfaces. Sanitizers are regulated by the Food and Drug Administration (FDA), while disinfectants are regulated as pesticides by EPA.

In 2016, FDA banned 19 antimicrobial ingredients in hand soap, including triclosan,² finding them no more effective than plain soap and water.

DISINFECTANTS AND SANITIZERS IN PUBLIC HEALTH EMERGENCIES

It is important during public health emergencies involving infectious diseases to scrutinize practices and products very

carefully so that hazards presented by the crisis are not elevated because of the unnecessary threat introduced with toxic chemical use. Beyond Pesticides is compiling and updating resources for safer decisions, which are updated on the organization's website, www.bp-dc.org/disinfectants.

PROTECTION FROM COVID-19 (CORONAVIRUS) WITHOUT TOXIC SANITIZERS AND DISINFECTANTS

The coronavirus can be fought with common sense prevention and safer disinfection products. In the management of viral and bacterial infections, it is always important that we do not exacerbate the risk to individuals in the process of avoiding or controlling the threat. It is important to avoid products that increase vulnerability to respiratory problems or weaken the immune system. In the case of Covid-19, there are protective measures—both practices and products—that can protect us without using toxic products that increase risk factors.

WHY THE CONCERN ABOUT TOXIC SANITIZERS AND DISINFECTION PRODUCTS?

CDC reports an increase in calls to poison control centers regarding illnesses resulting from use or misuse of toxic disinfectants during the pandemic.³ In May, the World Health Organization (WHO) released an updated advisory that warns, "Spraying disinfectants can result in risks to the eyes, respiratory or skin irritation and the resulting health effects."⁴ "Spraying or fogging of certain chemicals, such as formaldehyde, chlorine-based agents or quaternary ammonium compounds, is not recommended due to adverse health effects on workers in facilities where these methods have been utilized," WHO reports.

Disinfectants are designed to be used on hard surfaces, while sanitizers are made to be used on skin. Neither type is meant to be ingested. FDA warns that disinfectant sprays or wipes should not be used on skin because they may cause skin and eye irritation.⁵

Furthermore, the Covid-19 crisis has elevated public understanding that there are people who are more vulnerable to the effects of the virus. These are generally people who have a preexisting condition or are of advanced age, who may have a weakened immune or respiratory system. With the management of viral and bacterial infections, it is always important that risk to individuals is not exacerbated in the process of avoiding or controlling the threat. Many of the products approved as sanitizers and disinfectants by FDA or EPA may have negative impacts on the respiratory or immune system, thus reducing resistance to the disease.

In the case of Covid-19, there are protective measures—both practices and products—that offer protection without using toxic products that increase risk factors.

PREVENTION

The good news is that toxic chemicals are not necessary to prevent exposure to Covid-19 and eliminate the virus. CDC urges simple measures to prevent exposure:

- Avoid close contact with people who are sick.
- Avoid touching your eyes, nose, and mouth.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Stay home.
- Practice social distancing: stay at least six feet from other people.
- Wear a mask in public.
- Wash hands frequently with soap and water or use an alcohol-based hand sanitizer.

How it works: The best way to prevent any infectious disease transmission is to stay out of contact with those who have already contracted the disease.

HAND CLEANING AND SANITIZING

Eliminating the Virus on Hands

- Wash hands often with soap and water for at least 20 seconds. Antibacterial soap is not necessary. If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60% ethanol or 70% isopropanol. Always wash hands with soap and water if hands are visibly dirty or, if washing is not feasible, rub off visible dirt before using a hand sanitizer.

How it works: Soap breaks down the virus's fat membrane—and the infectious material falls apart—as long as you rub the soap on your hands for at least 20 seconds. Alcohol sanitizers with 60% ethanol or 70% isopropanol do the same thing. These chemicals break down the virus by a similar process, by breaking down the lipid covering of the virus.⁶

FDA regulates hand sanitizers. Only products with active ingredients ethanol, isopropanol, or benzalkonium chloride can qualify as "hand sanitizers" according to FDA. However,



iStockphoto/Imgorthand



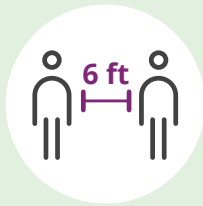
Market Rules



wear your mask



wash your hands



keep distance



don't touch products



vendors **CAN'T**
handle reusable bags



no eating



no pets



follow instructions



THANK YOU!

Massachusetts Farmers Market public safety signage.

CDC says evidence shows that benzalkonium chloride is less reliably effective against the coronavirus than alcohol.⁷ An alcohol-based hand sanitizer should contain at least 60% ethanol or 70% isopropanol in order to be effective.⁸

In 2016, FDA banned 19 antimicrobial ingredients in hand soap, including triclosan,⁹ finding them no more effective than plain soap and water.

The Good: Soap or Alcohol

The most effective way to remove the coronavirus from hands is to wash with soap and water, for at least 20 seconds.

If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60% ethanol or 70% isopropanol. Glycerol or aloe as part of the remainder can help counter the drying effects of alcohol on the skin.

The Bad: Toxic Sanitizers

Avoid hand sanitizers containing benzalkonium chloride (BAC), which is a quaternary ammonium compound (or "quat"). It is an irritant that can cause asthmatic reactions and adversely affect the respiratory system.^{10,11} BAC is also associated with

changes in neurodevelopment,¹² selection for antibiotic resistance,¹³ and irritation and/or contact dermatitis.¹⁴ In addition, CDC reports that BAC is less reliable than the alcohols.¹⁵

DISINFECTING SURFACES

Eliminating the Virus on Surfaces

- Clean and disinfect frequently touched objects and surfaces using regular household cleaning sprays, soap or safer disinfectants. Disinfectants are ineffective if used on dirty surfaces because their disinfectant power is wasted attacking dirt.¹⁶ Ordinary soap, detergent, and water can be used for cleaning.

How it works: Like handwashing with soap or using alcohol hand sanitizer, the virus on surfaces can be detached and broken down with soap and alcohol.¹⁷

EPA's "List N" contains products approved for use against the coronavirus. In response to the question, "How does EPA know that the products on List N work on SARS-CoV-2?" EPA says:

While surface disinfectant products on List N¹⁸ have not been tested specifically against SARS-CoV-2, the cause of COVID-19, EPA expects them to kill the virus because they:

- Demonstrate efficacy (e.g., effectiveness) against a harder-to-kill virus; or
- Demonstrate efficacy against another type of human coronavirus similar to SARS-CoV-2.

All surface disinfectants on List N can be used to kill viruses on surfaces, such as counters and doorknobs.

Because SARS-CoV-2 is a new virus, this pathogen is not readily available for use in commercial laboratory testing to see if a certain disinfectant product is effective at killing the virus.

While all of these disinfectants eliminate the virus, some are safer to use than others. Some may actually increase risk from coronavirus through their effects on respiratory and immune systems.

The Better-Good: Natural-based substances tend to be safer, while still effective at eliminating the virus on surfaces. Look for products with the following active ingredients (* indicates listed by EPA's Design for the Environment Program (DfE) or Safer Choice Program). This category is subdivided because active ingredients are found in products with other, or "inert," ingredients, which regularly make up the majority of a product's formulation, are toxic, and not disclosed on the product label. Because DfE is a voluntary program, its list is limited to manufacturers that choose to participate with individual product reviews.

Better. Below, the full formulation of product ingredients, including "inerts," has been evaluated and listed by DfE/Safer Choice, but "inerts" are not disclosed to the public:

- *CleanCide* (EPA Reg No. 34810-35; active citric acid)
- *Contec Citric Acid Disinfectant* (EPA Reg No. 34810-35-71670; active citric acid)
- *Lysol® Cleaner with Hydrogen Peroxide: Citrus Sparkle Zest* (EPA Reg No. 777-126; active hydrogen peroxide)
- *Purell Products* (EPA Reg No. 84368-1-84150; active ethanol) (See www.bp-dc.org/disinfectants for complete list of *Purell* products.)
- *Wexford Disinfectant Wipes* (EPA Reg No. 34810-37; active citric acid)
- *ACCEL 5 RTU* (EPA Reg No. 74559-8; active hydrogen peroxide)

Good. While the active ingredients with an asterisk below are DfE listed, the “inert” ingredients in most products containing these active ingredients have not received the DfE/Safer Choice listing (except those in the “better” category above).

- Citric acid*
- Ethanol*
- Isopropanol*
- L-lactic acid*
- Hydrogen peroxide*
- Sodium bisulfate*
- Thymol
- Dodecylbenzenesulfonic acid*²⁰

The Bad: EPA has approved a long list of products²¹ that will eliminate the Covid-19 virus on surfaces. The list includes products containing toxic chemicals, such as chlorine bleach, peroxyacetic acid, quaternary ammonium compounds or “quats,” sodium dichloro-s-triazinetrione, and hydrochloric acid. Exposure to these chemicals are associated with a long list of adverse effects, from asthma to cancer.^{22,23} Avoid products containing:

- Peroxyacetic acid (peracetic acid)²⁴
- Chlorine compounds (sodium hypochlorite, hypochlorous acid, sodium chlorite, sodium chloride²⁵)
- Sodium Dichloro-S-Triazinetrione
- Quaternary Ammonium compounds (quats)
- Iodine²⁶
- Phenolic compounds
- Glycolic acid
- Octanoic acid²⁷
- Potassium peroxymonosulfate²⁸
- Ammonium carbonate²⁹
- Ammonium bicarbonate¹⁸
- Silver³⁰
- Glutaraldehyde³¹

PRODUCTS: WHAT TO USE AND WHAT TO AVOID

The Beyond Pesticides website offers a guide³² to buying disinfectants and sanitizers, regularly updated as EPA adds more products to List N.³³ (See www.bp-dc.org/disinfectants.)

Claims that characterize disinfectant properties are not made unless backed up by FDA or EPA. Even though these

agencies have not provided complete and adequate regulatory oversight, based on a history of criticism by review agencies³⁴ and scientific critiques, their judgment on the issue of efficacy is used until/unless there is a better, more authoritative source. However, the agencies list toxic sanitizers and disinfectants that pose hazards in their use, especially to those with existing respiratory or immune conditions. For that reason, the review of sanitizers and disinfectants focuses on the threats to the respiratory and immune systems.

CHECK THE PRODUCT LABEL!

It is important to examine all chemical ingredients on the disinfectant and sanitizer product labels. Also, look at the use instructions to ensure that the method of use is compatible with your need. Some products require a longer contact time with the surface than others. Some may be applied as a spray, while others may be wiped onto the surface.

The first chemical ingredient is not the only chemical ingredient to consider when looking for a nontoxic sanitizer and disinfectant. Even if the first chemical ingredient is nontoxic, the following chemical ingredients are not always nontoxic (e.g., hydrogen peroxide is a nontoxic sanitizer, while hydrogen peroxide with peracetic acid is a highly toxic disinfectant).

Fight the coronavirus with common sense prevention and safer disinfection products. Avoid products that increase vulnerability to respiratory problems. All ingredients listed as “bad” are associated with harm to the respiratory system.^{35,36,37,38,39,40} In addition, some quats have been shown to cause mutations, lower fertility, and increase antibiotic resistance.⁴¹ Phenolic compounds include a wide range of toxic chemicals, including cresols, hexachlorobenzene, and chlorophenols. Health effects from breathing or exposure to the skin include headaches, burning eyes, muscle tremors, skin burns, irregular heartbeat, severe injury to heart, liver, kidneys, and lungs, cancer, and death.^{42,43}

STAY SAFE

It is important during public health emergencies involving infectious diseases to scrutinize practices and products very carefully so that hazards presented by the crisis are not elevated because of the unnecessary threat introduced with toxic chemical use.

The endnotes indicated in the text of this piece can be found at www.bp-dc.org/disinfectantscited.



Alamy/Jim McDowall

ENDNOTES

- 1 <https://www.cdc.gov/oralhealth/infectioncontrol/faqs/cleaning-disinfecting-environmental-surfaces.html>.
- 2 <https://www.beyondpesticides.org/programs/antibacterials/triclosan>.
- 3 New York Times, April 22, 2020. As Coronavirus Spreads, Poison Hotlines See Rise in Accidents With Cleaning Products, <https://www.nytimes.com/2020/04/21/health/coronavirus-poison-hotlines-rise-in-accidents-disinfectants.html>.
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- 16 <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cleaning-disinfection.html>.
- 17 Kampf, G., Todt, D., Pfaender, S. and Steinmann, E., 2020. Persistence of coronaviruses on inanimate surfaces and its inactivation with biocidal agents. *Journal of Hospital Infection*.
- 18 <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>.
- 19 <https://www.epa.gov/pesticide-labels/design-environment-logo-antimicrobial-pesticide-products>. Disinfectants are pesticides and are covered by DfE; other materials, such as surfactants are covered by SCP.
- 20 Inhalation risk is low because dodecylbenzenesulfonic acid is applied using large, non-respirable droplet sizes in order to be effective. (European Chemicals Agency dossier.) Dodecylbenzenesulfonic acid is a safer surfactant according to the SCP.
- 21 <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>. Unlike other pesticides, EPA must verify the efficacy of disinfectants. EPA says that these have been shown to be effective against SARS-CoV-2, the cause of COVID-19, by demonstrated efficacy against a harder-to-kill virus or demonstrated efficacy against another type of human coronavirus similar to SARS-CoV-2.
- 22 https://prhe.ucsf.edu/sites/g/files/tkssra341/f/Fact%20Sheet_Information%20for%20Workers.pdf.
- 23 Agency on Toxic Substances and Disease Registry, 2008. ToxFQAQs for Chlorophenol. <https://www.atsdr.cdc.gov/toxprofiles/tp107-c1.pdf>.
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- 25 Sodium chloride as listed by EPA is actually hypochlorous acid
- 26 ZZZ Disinfectant SDS https://cleaningsolutions.delaval.com/wp-content/uploads/2018/07/ZZZ-Disinfectant-2056-SDS_EN.pdf; ZZZ Disinfectant Label https://www3.epa.gov/pesticides/chem_search/ppls/004959-00016-20170614.pdf.
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