

Methanol Safety During the COVID-19 Pandemic

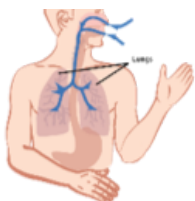
Methanol (or methyl alcohol) should not be used as a hand sanitizer, hand rub, or surface cleaner to kill the virus that causes the COVID-19 ("coronavirus") disease. Ethanol (or ethyl alcohol) and isopropanol (or isopropyl alcohol) are two alcohols that can be safely and effectively used to sanitize hands and to disinfect surfaces. None of these alcohols can cure COVID-19. Methanol is not a safe alcohol to use because it can cause serious damage to organs in the body if a person swallows it, breathes it in, or gets it on their skin. For more information on methanol as well as on proper and safe sanitation/disinfection, please see the FAQs.

What is Methanol?

Methanol (also called methyl alcohol, wood alcohol, or carbinol) is a colorless liquid with a pungent alcohol odor. Although it is naturally occurring in wood, decaying vegetation, and volcanic gases and is biodegradable, methanol is both highly flammable and toxic to humans and animals.

How might I be exposed to methanol?

Inhalation



Ingestion



Dermal






Methanol is used as an industrial chemical and fuel source. Low amounts of methanol can be found in many household products including inks and dyes, adhesives, antifreeze, paint thinner, and cleaning products, as well as in some fruits and vegetables and alcoholic and non-alcoholic fermented beverages. Because there is methanol in the human diet, there are small amounts of methanol in the human body. Sometimes there are dangerous levels of methanol in alcoholic and non-alcoholic fermented beverages. Exposure to methanol can occur through ingestion (swallowing), inhalation (breathing), and eye or skin contact with any of the products mentioned above.

Why is methanol harmful to adults and children?

Public health agencies have reported that methanol has a weak ability to kill viruses when compared to other alcohols, but can be toxic to humans. When a person is exposed to methanol, it is absorbed through the skin, stomach, or lungs (depending on the route of exposure), and most of it becomes formaldehyde in the body. Formaldehyde is then rapidly changed into formic acid in the liver. Formic acid can cause death or damage to the brain and to the optic nerve leading to blindness.

Oral ingestion of as little as 10-30 mL (or about 1-2 US tablespoons) can lead to serious harm or death for an adult.

Outbreaks of methanol poisoning have occurred throughout the world, primarily due to the consumption of informally or illicitly produced or adulterated alcoholic beverages and spirits.

Chemical Labeling of Methanol	
	Highly flammable liquid and vapor
	Toxic if swallowed Toxic in contact with skin
	Toxic if inhaled
	Causes damage to organs

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Frequently Asked Questions (FAQs) About Methanol Safety and COVID-19



Can I use methanol in place of alcohol-based hand sanitizers or to disinfect my home?

No, methanol should not be used in place of ethyl alcohol- or isopropyl alcohol-based hand sanitizers or as a disinfectant to clean surfaces. First, public health agencies have reported that methanol has a weak ability to kill viruses when compared to other alcohols and is less effective than other alcohols. Second, methanol is much more toxic than ethyl or isopropyl alcohols, so it can cause bodily harm when it comes in contact with skin, is swallowed, or is inhaled.

What are the major alcohols approved and recommended for use as sanitizers/disinfectants, and why are they the sanitizers of choice?

Ethanol (ethyl alcohol) and isopropanol (isopropyl alcohol) are the alcohols approved by the US Food and Drug Administration (US FDA) for disinfection in health care settings, registered by the US Environmental Protection Agency (US EPA), and recommended by the World Health Organization (WHO) for use in alcohol-based hand rub formulations. US FDA reported that ethyl alcohol, isopropyl alcohol, and benzalkonium chloride (which is not an alcohol) are "the only active ingredients determined to be eligible for evaluation...for use in [over the counter] consumer antiseptic rub products."

If methanol is chemically similar to other alcohols, such as ethanol and isopropanol, why can it not be used as they are?

Although methanol is an alcohol like ethanol and isopropanol, methanol cannot be used as they are because it breaks down and produces different chemicals in the body. Ethanol produces acetate in the body, isopropanol produces acetone in the body, and methanol produces formaldehyde or formic acid in the body, which is more toxic and harmful than those produced by the other alcohols.

Has methanol been approved or recommended by public health authorities such as the World Health Organization (WHO) or the United States Centers for Disease Control and Prevention (US CDC) for use as a sanitizer?

No, the use of methanol as a main ingredient in hand sanitizer has not been approved or recommended by any governmental authority. Neither the US CDC nor US EPA approve or recommend methanol as a main ingredient to sanitize or disinfect. The European Union (EU) allows low levels of methanol in certain consumer products but recommends that use of methanol in these products be abandoned due to the potential for harm to people, especially children. Some countries have removed certain hand sanitizers from the market because the product contained a high level of methanol.

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Is there any safe level of methanol in hand sanitizers or disinfectants?

There are currently no regulatory safe levels for methanol in hand sanitizers or disinfectants. In the United States, products containing more than 4% methanol must be labeled as "poison." In Europe, products may contain up to 5% methanol in cosmetic and personal hygiene products.

Is there methanol in hand sanitizer that I buy at the store? How do I read the label for ingredients?

Small amounts of methanol may be present in some consumer products, including hand sanitizer, cholesterol drugs, vitamins, antibiotics, and hormones. Methanol is an impurity sometimes present in ethyl alcohol, and therefore, small amounts can be present in ethyl alcohol-based hand sanitizers or rubs. Product specifications limit the amount of methanol in ethyl alcohol to 0.5% or 0.2mL/L (USPNF, 2015).

Drug Facts	
Active ingredient[s] Alcohol 80% v/v	Purpose Antiseptic
Use[s] Hand Sanitizer to help reduce bacteria that potentially can cause disease. For use when soap and water are not available.	
Warnings For external use only. Flammable. Keep away from heat or flame Do not use: • in children less than 2 months of age • on open skin wounds	
When using this product keep out of eyes, ears, and mouth. In case of contact with eyes, rinse eyes thoroughly with water. Stop use and ask a doctor if irritation or rash occurs. These may be signs of a serious condition. Keep out of reach of children. If swallowed, get medical help or contact a Poison Control Center right away.	
Directions • Place enough product on hands to cover all surfaces. Rub hands together until dry. • Supervise children under 6 years of age when using this product to avoid swallowing.	
Other information • Store between 15-30C (59-86F) • Avoid freezing and excessive heat above 40C (104F)	
Inactive ingredients glycerin, hydrogen peroxide, purified water USP	

Because methanol is an impurity in ethyl alcohol, it is not listed as an active ingredient on the label. There have been cases of methanol poisoning in individuals who drank large amounts (500 mL or about 2 US cups) of alcohol-based hand sanitizer containing methanol that was not declared on the ingredients (Chan & Chang, 2018).

Can drinking methanol cure or protect me from COVID-19 or other viruses?

No, drinking methanol will not cure or protect adults or children from COVID-19 or other viruses, and instead may cause serious harm including blindness, brain damage, and death if people drink methanol or methanol-containing beverages.

How can I avoid methanol poisoning?

- Do not use methanol as a hand sanitizer on skin or as a disinfectant in the home.
- Do not consume alcohol-based hand sanitizers or hand rubs.
- Do not consume methanol or informally or illicitly produced or adulterated alcoholic beverages and spirits that may contain methanol.

What are the signs of methanol poisoning?

Signs of methanol poisoning may present 1 to 72 hours after exposure.

- Neurological symptoms include drowsiness, headache, confusion, amnesia, dizziness, acute mania, a lack of coordination of muscle movements, agitation, seizure, and decreased level of consciousness (central nervous system depression).
- Gastrointestinal symptoms include severe abdominal pain, diarrhea, nausea, vomiting, bleeding, and a lack of appetite.
- Eye-related symptoms visual disturbances or hallucinations, sensitivity to light, blurred vision, and partial to total loss of vision.

Is there treatment for methanol poisoning?

Yes, if someone experiences symptoms of methanol poisoning, it is important to seek medical attention immediately. Medical professionals can provide supportive care to stop the human body from changing methanol into formaldehyde and formic acid.

Resources for More Information:

World Health Organization, 2014. "Methanol Poisoning Outbreaks"

https://www.who.int/environmental_health_emergencies/poisoning/methanol_information.pdf

Methanol Institute, 2020. "Methanol Safe Handling Manual, 5th Edition"

https://www.methanol.org/wp-content/uploads/2020/03/Safe-Handling-Manual_5th-Edition_Final.pdf

European Chemicals Agency (ECHA), 2020. "Brief Profile: Methanol"

<https://echa.europa.eu/brief-profile/-/briefprofile/100.000.599>

The National Institute for Occupational Safety and Health (NIOSH), 2011. "METHANOL: Systemic Agent"

https://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750029.html

US Centers for Disease Control and Prevention (US CDC),

2020. "Cleaning and Disinfection for Households: Interim Recommendations for U.S. Households with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19)"

[https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cleaning-disinfection.html?](https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cleaning-disinfection.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fprepare%2Fcleaning-disinfection.html)

[CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fprepare%2Fcleaning-disinfection.html](https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cleaning-disinfection.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fprepare%2Fcleaning-disinfection.html)

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