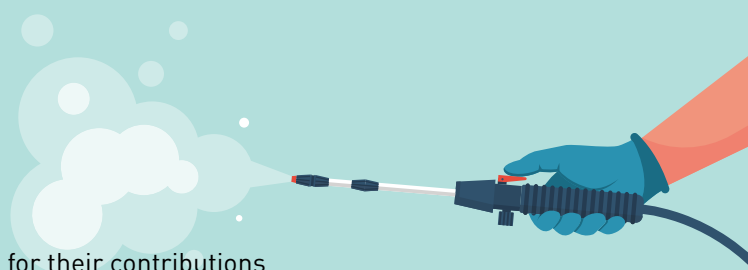


# COVID-19 RESEARCH STUDIES FACT SHEET

ACADEMY OF SCIENCES MALAYSIA (ASM)

ASM is a statutory body of eminent Malaysian scientists elected for their contributions to science. At this period of unprecedented uncertainty due to the Covid-19 pandemic, ASM has established a Special Interest Group (SIG) on COVID-19 comprising Fellows of the Academy, Young Scientists Network (YSN-ASM) and Top Research Scientists Malaysia (TRSM) who are the expert network of ASM to review key research findings around the world and issue fact sheets to help the public understand the implications (and limitations) of the research studies. This factsheet describes the cleaning, sanitising and disinfection against COVID-19. Types of disinfectants, factors affecting disinfection efficacy, how to disinfect on different type of surfaces and common disinfectants which should be registered with Environmental Protection Agency (EPA) are discussed. Disinfectants fogging and spray booth are also explained in this factsheet.



## CLEANING, SANITISING & DISINFECTION AGAINST COVID-19

According to the World Health Organisation (WHO), the transmission of SARS-CoV-2 among people is primarily through respiratory droplets and contact routes. This transmission can occur by direct and/or indirect contact in the immediate environment or with surfaces touched or objects used by the infected person. Studies suggest that SARS-CoV-2 might stick on objects or surfaces and remain in an active state for a few hours or up to several days, protected by a cosy covering mucus. The survival of the virus may differ under different conditions including temperature and humidity of the environment as well as the type of surface.

Thus, cleaning and disinfecting are among the most reliable ways to help lower the risk of spreading COVID-19 from surfaces by touch. United States Environmental Protection Agency (US EPA) has been providing information about disinfectants to the public that can help slow the SARS-CoV-2 virus spread and to date a total of 374 products have been listed. These EPA-registered products could guide the consumers in choosing the right disinfectant based on the type of surfaces to be used and the active ingredients.

**For hard non-porous surfaces**, most of the disinfectants that can be used contained a range of active ingredients including sodium hypochlorite, sodium chlorite, hypochlorous acid, hydrogen peroxide, quaternary ammonium, alcohols, phenol, sodium dichloroisocyanurate dehydrate, sodium carbonate peroxyhydrate, sodium dichloro-S-triazinetrione, potassium peroxymonosulfate, or peroxyoctanoic acid.

**For porous surfaces**, the active ingredients are hydrogen peroxide and quaternary ammonium.

**For sensitive surfaces** such as human skin and electronics, alcohol-based disinfectants are recommended.



### Cleaning

describes a process of removing visible soil including dust, debris and dirt from surfaces and objects by scrubbing, washing and rinsing. This is normally accomplished manually or mechanically using water with enzymatic products or detergents.



### Disinfecting

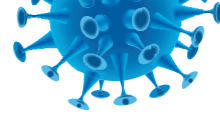
refers to a process that destroys or inactivate pathogenic microorganisms on inanimate objects or surfaces by using active chemicals.



### Sanitising

is a process of lowering the quantity of pathogenic microorganisms on objects or surfaces to a safe level, as judged by public health standards or requirements. This process can be done by either cleaning or disinfecting.

KNOW THE TERMS



## TYPES OF DISINFECTANTS (At similar concentration)

- Chemical sterilants - kill spores through extended contact times (3–12 hours).
- High-level disinfectants kill all microorganisms with shorter exposure periods. This excludes large numbers of bacterial spores.
- Low-level disinfectants kill some viruses and fungi, and most vegetative bacteria in a practical duration ( $\leq 10$  minutes).
- Intermediate-level disinfectants may kill most viruses and fungi, all mycobacteria and vegetative bacteria but do not necessarily kill bacterial spores.

## FACTORS AFFECTING DISINFECTION EFFICACY

- Prior cleaning of the object surface
- Amount of inorganic and organic matter present
- Type and level of microbial contamination
- Concentration of and contact time to the disinfectants
- Physical nature of the object (e.g. hinges, lumens, and crevices)
- Presence of biofilms
- pH and temperature during disinfection process



## COMMON DISINFECTANTS

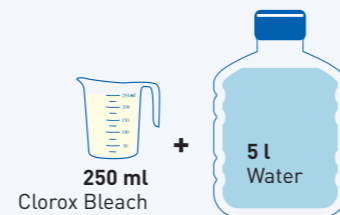
• There are many products used for disinfections. However, not all are strong enough to destroy or deactivate viruses, particularly those causing COVID-19. To make sure the products are effective, they should be registered as an EPA-approved disinfectant. This can be confirmed by looking for an EPA registration number on the product label.

• Proceed to visit the US EPA's site at <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>, scroll down to view a systematic Table. The EPA registration number can be typed in the 'search' box provided on the Header or inside the Table. If it is recommended for COVID-19, the information of the product (i.e. active ingredient, product name, company, formulation type, surface types for use and contact time) will be located accordingly. The Table is designed to facilitate searching, thus can be easily used to guide upon confirming a household disinfectant status.

• The most common active ingredients of the disinfectants are quaternary ammonium (202 products), sodium hypochlorite (57 products) and hydrogen peroxide (52 products). If consumers are looking for products containing sodium hypochlorite as the active ingredient, or they want to ensure that the product they bought is effective towards SARS-CoV-2, they can 'search' in the Table, and it will be sorted accordingly.

• Some of the products are ready to use and some need dilution. Thus, read the instructions on the product carefully and prepare the correct dilution by adding water accordingly. For instance the product 'Clorox Disinfecting Bleach' which contain sodium hypochlorite as the active ingredients, would need dilution.

(a) To make a disinfectant bleach solution, mix:



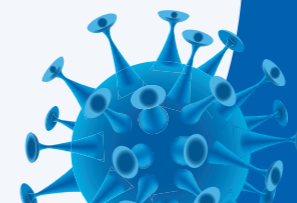
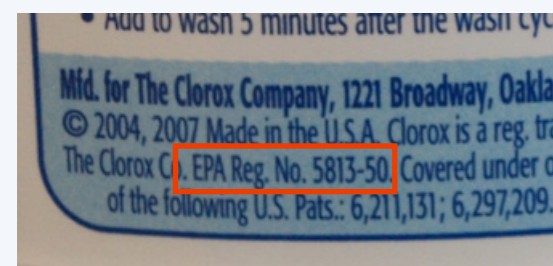
(b) This bleach and water solution must be prepared fresh for use.

(c) If the solution is not prepared fresh, the effectiveness of the disinfectant will be reduced daily and up to 50% reduction after 30 days of storage (e.g., by day 30, the concentration of 600 ppm of chlorine will decrease to 300 ppm).

• For all the EPA-registered products, read and follow the instructions on the label carefully to ensure the safety and effectiveness in usage. Make sure,  
(a) the expiry date of the product has not passed.  
(b) the household disinfectants were not mixed together or with any other cleaning products, especially those containing vinegar or ammonia. Some chemicals do not mix well and can cause a reaction that releases toxic gases.

• A recent study showed that SARS-CoV-2 can also be deactivated with alcohol solutions (more than 30%) with a contact time of 30 seconds. However, due to practicality, a formulation greater than 60% ethanol or 70% isopropanol with contact time more than 60 seconds is recommended by the CDC. Follow the product instructions.

- o Low concentrations of alcohol have a slower evaporation rate thus increasing the contact time required for disinfection.
- o Higher concentrations of alcohol would not be as effective due to their fast evaporation and probably will require additional applications to disinfect.
- o Alcohol-based disinfectants are suitable to be used for more sensitive surfaces such as our skin, electronic equipment and more practical for wiping frequently-touched including door knobs, lift, light switches and handles.



## HOW TO DISINFECT ?

### • Wear gloves.



- o For disposable gloves, discard them after every use.
- o For re-usable gloves, use them ONLY for cleaning and disinfecting. Do not use them for any other purpose.

- If it is dirty, clean the object or surface with soap or another detergent, and rinse with water.
- Use an EPA-registered household disinfectant that is recommended against SARS-CoV-2 virus.
  - o Allow the solution to contact the surface for a period of time (see product label)
  - o Make sure the working space has proper ventilation (such as a room with an open window) when using the product. Spend less time in confined spaces.



- **For hard non-porous surfaces** such as glass, metal, ceramic and others:
  - o Clean surface using soap and water to remove all visible dirt.
  - o Rinse the surface with clean water and wipe with a clean towel.
  - o Disinfect with an EPA-registered household disinfectant and allow the surface to air dry.
  - o Rinse food preparation area surfaces with potable water after disinfection.
  - o Consider disposable single-use mop heads or cloths. If not possible, the mop heads should be cleaned with soap and disinfect with an EPA-registered product and allowed to dry.
  - o Remove gloves and wash hands right away.



- **For soft surfaces** such as carpeted floor, mats, and drapes:
  - o Clean the surface using soap and water or with appropriate cleaners. If possible, launder items according to the manufacturer's instructions. Apply the suitable warmest water setting and dry items completely. If not,
  - o sanitise with an EPA-registered household disinfectant.



- **For porous surfaces/** materials such as towels, clothing, linens and other items:
  - o Follow the instructions of the manufacturer when laundering the items. Apply the possible warmest water setting and dry items completely.
  - o Dirty laundry from a person who is sick can be washed with other people's items. Wear disposable gloves when handling.
  - o Do not shake dirty laundry.
  - o Follow the instruction of the manufacturer for cleaning and disinfecting clothes hampers.
  - o Remove gloves and wash hands right away.



- **For electronics** such as remote controls, keyboards, touch screens, and tablets:
  - o Consider putting a wipe able cover on electronics.
  - o Clean and disinfect according to the manufacturer's instructions. If there is no guidance provided, use alcohol-based sprays or wipes containing recommended concentrations. Dry surface thoroughly. Do not use bleach.



- **For frequently-touched surfaces** such as door knobs, countertops, lift, light switches, handles, desks, toilets, faucets, and sinks:
  - o Wipe the surfaces with alcohol recommended solutions or an EPA-registered household disinfectant.
  - o Use more than one disposable wipes and make sure to use enough to leave the surface visibly wet for at least four minutes until it air-dries.
  - o Rinse food contact surfaces with potable water after disinfection.
  - o Remove gloves and wash hands right away.



- **For skin**, especially the hands:
  - o Wash hands frequently with soap and water, and dry hands using a clean towel or air dry.
  - o If there is NO access to soap and water, use alcohol-based hand sanitiser. For practicality, CDC guidelines recommend formulation with greater than 60% ethanol or 70% isopropanol.
  - o When applying hand sanitiser, use enough product to cover all surfaces on hands and rub hands together, until hands feel dry. This should take around 20 seconds.
  - o Hands should be washed with soap and water immediately when possible as hand sanitisers may not remove harmful chemicals, especially pesticides and heavy metals such as lead.

## DISINFECTANT FOGGING

- In *Health-Care Facilities CDC* does not support disinfectant fogging. This is particularly for active ingredients that are not EPA-registered for use in fogging-type applications such as formaldehyde, phenol-based agents or quaternary ammonium. Individuals who are exposed to the disinfectants fog may experience asthma, nausea, eye irritation, and headache.
- The fog particles can be absorbed into the body in greater quantities and much quicker than larger particles. Furthermore, the long-term consequences of converting a disinfectant from liquid to a dry mist (i.e. fogging) are unknown.
- However, in an open area, according to the US Cleaning and Disinfection SOP, few factors need to be considered before doing so.
- Sidewalks should not be fogged as the sunlight and dryness would not allow the survival of the virus.
- The least toxic EPA-registered disinfectant (i.e. alcohol or hydrogen peroxide) should be used to minimise the environmental impact.

## TAKE-HOME MESSAGE

- Thorough cleaning is necessary prior to high-level disinfection to avoid interference of the visible dirt on the objects and surfaces.
- Each disinfectant product is formulated differently. Different products containing different active ingredients, thus require different contact time to effectively kill a particular virus.
- Before purchasing, do read the label to ensure it is an EPA-registered disinfectant product. Some varieties are not strong enough to kill viruses.
- Alcohol-based disinfectant is used for more sensitive surfaces.

## DISINFECTANT SPRAY BOOTH/ CHAMBER/ TUNNEL/ PARTITION/ GATE

- Spraying disinfectant directly to the human body is not recommended. The disinfectant could irritate the skin, eyes and mouth and cause respiratory disorders.
- Most of the spraying process takes approximately 20 to 30 seconds in each round of disinfection which is not enough to deactivate coronavirus.
- Furthermore, spraying the external part of the body with disinfectant does not kill the virus inside the body of an infected person.
- However, this might be useful for health-care workers to disinfect themselves in full PPE attire after handling the dead bodies.



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02 September 2020