



SARS-CoV-2: SELECTING AND APPLYING AN APPROPRIATE SURFACE DISINFECTANT

INTRODUCTION:

According to CDC, the novel coronavirus (SARS-CoV-2) is spread from person-to-person¹. This happens most frequently during close contact (within 6 feet) with an infected individual via respiratory droplets when an infected individual coughs or sneezes.

The transmission of SARS-CoV-2 to persons from surfaces contaminated with the virus is not clearly documented¹. There is, however, evidence that suggests SARS-CoV-2 may remain viable for hours to days on surfaces made from a variety of materials². Cleaning and disinfecting of surfaces is a best practice measure for prevention of transmission of SARS-CoV-2 and other viral respiratory illness.

Many laboratories already have stocks of disinfectants on hand. Identifying which of these are effective against SARS-CoV-2 is a critical step in preparing personnel for the re-opening of WSU research facilities and ensuring a safe work environment.

ENVIRONMENTAL PROTECTION AGENCY (EPA) REGISTERED DISINFECTANTS³

Ensure your product is an EPA-approved disinfectant that is effective against SARS-CoV-2. The list of EPA-approved disinfectants can be found at the following link: <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>

- Examples of EPA-approved disinfectants commonly found in WSU laboratories are listed in Table 1.
- The EPA number for each product can be found on the original container for registered products.
- Pay close attention to the required contact time listed on the EPA website for SARS-CoV-2. This may differ from the recommended duration listed on the container for viricidal activity.

Table 1. Examples of commonly used surface disinfectants in WSU Research Laboratories and the EPA recommended contact time for SARS-CoV-2.

| Product Name | EPA Registration Number | Active Ingredient | EPA Recommended Contact Time (minutes)* |
|---|-------------------------|--|---|
| AccelTB** | 74559-1 | Hydrogen Peroxide | 1 |
| Peroxigard RTU** | 74559-9 | Hydrogen Peroxide | 0.5 |
| PREempt RTU | 74559-1 | Hydrogen Peroxide | 1 |
| Spartan Diffense | 5741-28 | Sodium hypochlorite | 0.5 |
| Cavicide Bleach | 46781-15 | Sodium hypochlorite | 3 |
| Clorox Healthcare Bleach Germicidal Cleaner Spray | 56392-7 | Sodium hypochlorite | 1 |
| Lysol Disinfectant Spray | 777-99 | Quaternary ammonium compounds plus ethanol | 10 |
| Cavicide | 46781-6 | Quaternary ammonium compounds plus isopropanol | 2 |
| TB-Cide QUAT*** | 1839-83 | Quaternary ammonium compounds | 10 |

*Confirm that information for your product is up to date using the EPA online tool: <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>

**These disinfectants are routinely used in the WSU DLAR facilities

***TB-Cide QUAT is the primary disinfectant used by WSU FP&M for environmental cleaning



ACTIVE INGREDIENTS:

Hydrogen Peroxide: Stable and effective on surfaces. Shelf stable when stored according to manufacturer's recommendations⁴.

Sodium Hypochlorite: Standard household bleach* (sodium hypochlorite) is broad acting, but once diluted remains effective for limited time periods⁴. Longer contact times are required for surface disinfection with diluted household bleach (i.e. 30 minutes). Commercially available sodium hypochlorite products have an extended shelf life and have shorter, EPA recommended, contact times.

Quaternary ammonium compounds: Commonly used for sanitation of noncritical surfaces, such as floors, furniture, and walls and are also appropriate for disinfecting medical equipment that contacts intact skin⁴. Efficacy can be impacted by water hardness and materials such as cotton and gauze pads. Non-woven spun-lace wipes are recommended for application⁴.

Alcohols: 70% ethanol or isopropanol alone are widely used in laboratories, but the rapid evaporation rate makes achieving the required contact time on surfaces difficult, especially in biosafety cabinets with additional airflow.

There are many additional products on the market. Further information on active ingredients can be on the CDC website referenced above, or on the WSU OEHS website: <https://research.wayne.edu/oehs/pdf/proper-disinfectants.pdf>

***Household bleach or alcohol solutions:** Where possible, EPA approved disinfectants should be used. If you cannot locate an EPA approved disinfectant, then dilutions of unexpired household bleach or 70% alcohol solutions are an acceptable alternative.

BEST PRACTICES: CLEANING AND DISINFECTING WORKSPACES⁵

1. **Create a plan:** Document the cleaning and disinfecting plan. Ensure that each staff member understands the cleaning and disinfecting requirements, including how frequently each action must be performed.
2. **What materials do you have available that target SARS-CoV-2?** SARS-CoV-2 is an enveloped virus. This is important as a wide range of disinfectants effectively disrupt or strip away the lipid membrane on the outer surface of enveloped viruses. As such, many disinfectants available in your laboratory can be utilized to reduce the spread of SARS-CoV-2.
3. **What Personal Protective Equipment (PPE) is required?** Ensure you evaluate the Safety Data Sheet to determine what PPE is required, and what hazards are present due to the chemical nature of the disinfectant. Chemicals such as hypochlorites, quaternary ammonium compounds, and hydrogen peroxide can be irritants, caustic or toxic to the user. Ensure adequate ventilation in the locations used.
4. **Determine what needs to be cleaned/disinfected:** Surfaces that are infrequently touched can be cleaned with soap and water and do not need additional disinfection. Target frequently touched objects and surfaces for disinfection. High touch areas involving multiple people are primary targets for cleaning and disinfecting.
5. **Reduce the items that need to be cleaned/disinfected:** What items can be moved into storage to reduce the amount of cleaning required? Consider removing all soft and porous materials to reduce the challenges associated with cleaning and disinfecting such items.
6. **Evaluate your electronic equipment:** Is the equipment sensitive to chemical exposure? Can it be immersed? Is it porous, or absorbent? It is important to consult with the manufacturer to ensure that you use an approved disinfectant. Inappropriate use of a disinfectant can void the manufacturer's warranty. Consider the use of wipe-able covers for electronics.
7. **Clean work surfaces or object with soap and water to remove contaminants:** Cleaning a surface to remove contaminants is important prior to application of disinfectants. This is especially important in laboratories where incompatible materials may be present.



- a. **Evaluate the organic content of the materials being treated:** Organic load can impact the effectiveness of a disinfectant. For example, hypochlorites can be inactivated by organic matter (e.g. blood, soil etc).
 - b. **Consider any potential adverse chemical reactions:** What else is potentially present on the surfaces/work benches to be cleaned? How will it react with the disinfectant?
8. **Contact time matters:** EPA registered disinfectants must only be used in a manner that is consistent with the product labeling. Follow the instructions for the specific disinfectant selected regarding the types of surfaces that can be effectively treated (e.g. metal, wood, porous vs. non-porous etc.). Surfaces must be kept wet for the full time indicated.
 9. **Store and use disinfectants in a responsible and appropriate manner:** Follow the directions on the label. This is integral to achieving effective decontamination of work surfaces.
 10. **Do not mix bleach or other cleaning and disinfection products:** Mixing of disinfectants has led to workplace fatalities and must be avoided.

Please visit the CDC Website for additional information on reopening guidance on cleaning and disinfecting public spaces. <https://www.cdc.gov/coronavirus/2019-ncov/community/reopen-guidance.html>

REFERENCES:

1. [CDC Coronavirus Disease 2019 \(COVID 19\)](#)
2. Van Doremalen *et al.* [Aerosol and surface stability of HCoV-19 \(SARS-CoV-2\) compared to SARS-CoV-1.](#) NEJM, 2020
3. [United States Environmental Protection Agency](#)
4. [Guideline for Disinfection and Sterilization in Healthcare Facilities \(2008\)](#)
5. [CDC Guidance for Cleaning and Disinfecting](#)