

Overlooked Step May Worsen Spread of Covid-19

What the news missed, biofilm consequences, and what you need to know to clean it or breathe it.

By David Ableman

How long can the virus remain active?

On April 2, 2020, The Lancet, published a study showing Coronavirus lasts longest (seven days) on stainless steel, plastics and surgical masks¹. However, the CDC said, in the case of the Diamond Princess cruise ship, active virus was found on ship surfaces **17 days** after people were evacuated². While reports didn't state how, it is possible that active virus might have been hidden within the biofilm³ – a complex microbial structure which forms on surfaces and acts like a barrier, protecting microorganisms within. Research⁴ has even shown that certain viruses form biofilm-like assemblies.

What's Overlooked? Removing the biofilm. Vital facts that few understand.

- 1) According to the NIH, 80% of microbial infections⁵ in humans are associated with biofilms.
- 2) Studies show that traditional cleaning practices (including the use of bleach and antimicrobials) **DO NOT** remove biofilms.
- 3) Worse, because chemicals stop working as soon as they dry, microorganisms protected within the biofilm remain unaffected.
- 4) Potentially alarming, cleaners claiming to kill 99.9% or a similar percentage of "x" are misleading at best, and could be harmful, especially if used improperly or for unsuitable purposes. That's why *the FDA is suing the manufacturer of Purell*⁶. The underlying reason is that these products only kill the specified germs "Under Some Lab Conditions"⁷. Moreover, even if a chemical truly kills 99.9%, accept that 0.1% will remain⁸.
- 5) Bad microbes tend to be much more aggressive, and can subsequently grow at an accelerated rate. This occurs for two reasons: competition has been eliminated, and dead microbes provide abundant food. This process is now understood as a leading cause for numerous outbreaks, including Staph, C-Diff, E. Coli, and MRSA.

These facts imply that to improve virus eradication and prevent later recontamination, along with cleaning, you **MUST** inhibit continued growth of bad bacteria while removing the biofilm. The challenge is doing this safely or at least in a way that causes the least harm to people and the environment.

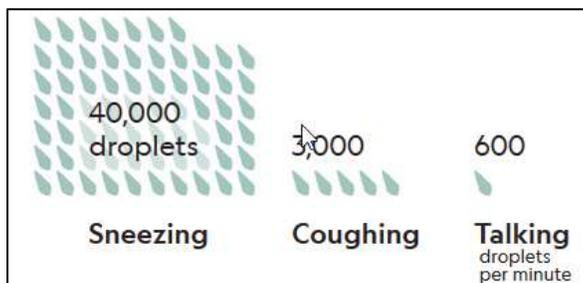
Talking spreads viruses⁹.

The CDC, government and others do provide good advice, but it's limited. Realize that these warnings are based on the statistical probabilities of getting infected from various sources. For example, if you are sneezed on by an infected person, it's possible you may not become infected. Conversely, hours after an infected person has left a room, you could become infected by simply entering that room and breathing in. Moreover, it is now clear that people without symptoms can also infect others.



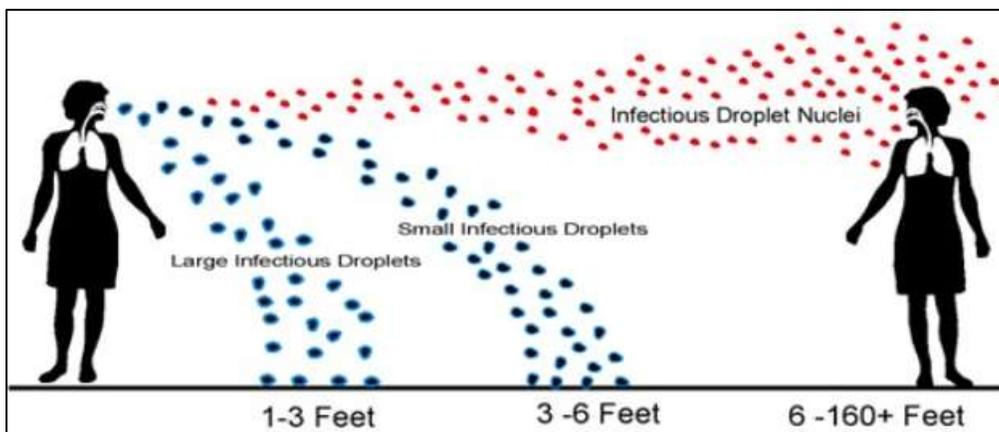
CLEAN IT OR BREATHE IT!®

Consider that viruses are extremely small. Billions can fit on the head of a pin. Outside a living cell, a virus is a dormant particle that can't go anywhere. The primary method of dispersal is by hitching a ride within a droplet of mucus or saliva. These droplets are ejected whenever we cough, sneeze, or simply talk. Studies show that talking for 5 minutes is comparable to a single cough which generates as many as 3,000 droplets. Moreover, droplets can remain airborne for hours.



Typical Dispersion Rates

6 feet away is NOT enough.



Infectious Droplet & Droplet Nuclei Travel Lengths¹⁰

Cover your eyes.

A virus can enter the human body through the eyes, mouth, or nose. It then looks for cells with a compatible receptor so it can invade and start replicating itself. For SARS-CoV-2, primary receptor locations include the lungs, intestine, heart and kidney.

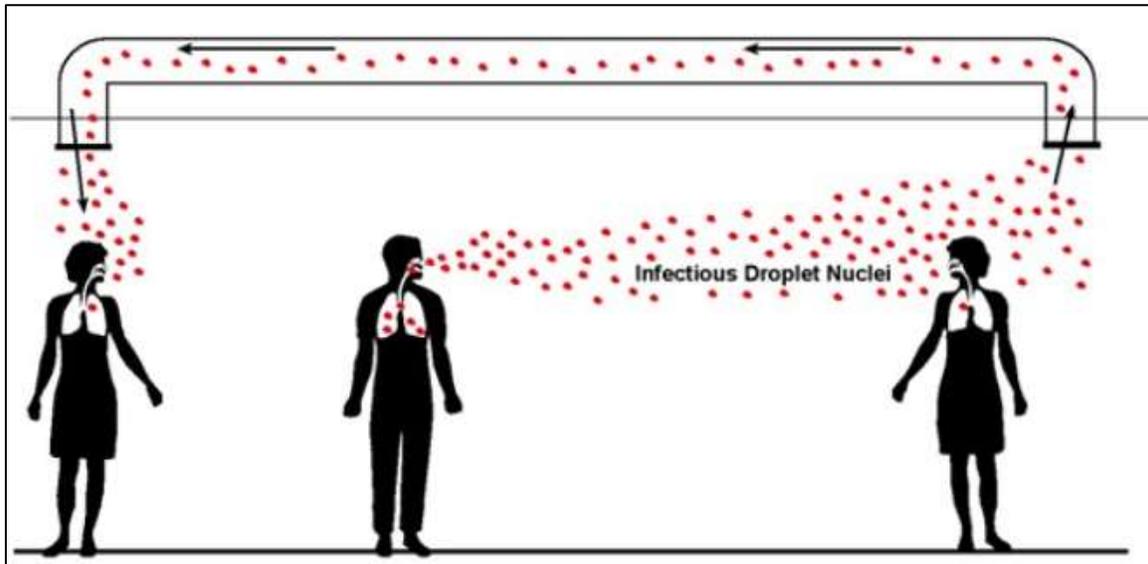
N95 masks are NOT 100% effective.

An essential form of personal protective equipment (PPE), N95 masks are highly recommended at this time for everyone. As you've likely seen, they are standard attire in many places in China and Japan. But they aren't perfect. 3M, the world's largest maker of respirator masks, warns its consumers "no matter how well a respirator seals to the face and how efficient the filter media is ... no respirator will eliminate exposures entirely."

Worse, most people don't know how to properly wear masks in the first place. One study conducted in New Orleans after Hurricane Katrina found that only 24% used their N95 masks correctly.

The "95" in an N95 means it captures 95% of particles that are 0.3 microns. In other words, 5% penetrate. But what's the significance of 0.3 microns? Scientists determined that particles of that size evade air filters the most – more than larger or even smaller particles such as Coronavirus, which is approximately .06–.14 microns. The good news is that N95 masks stop the vast majority. The problem is, more than enough can still penetrate and infect you.

Research proved that HVAC systems spread SARS.^{11,12}



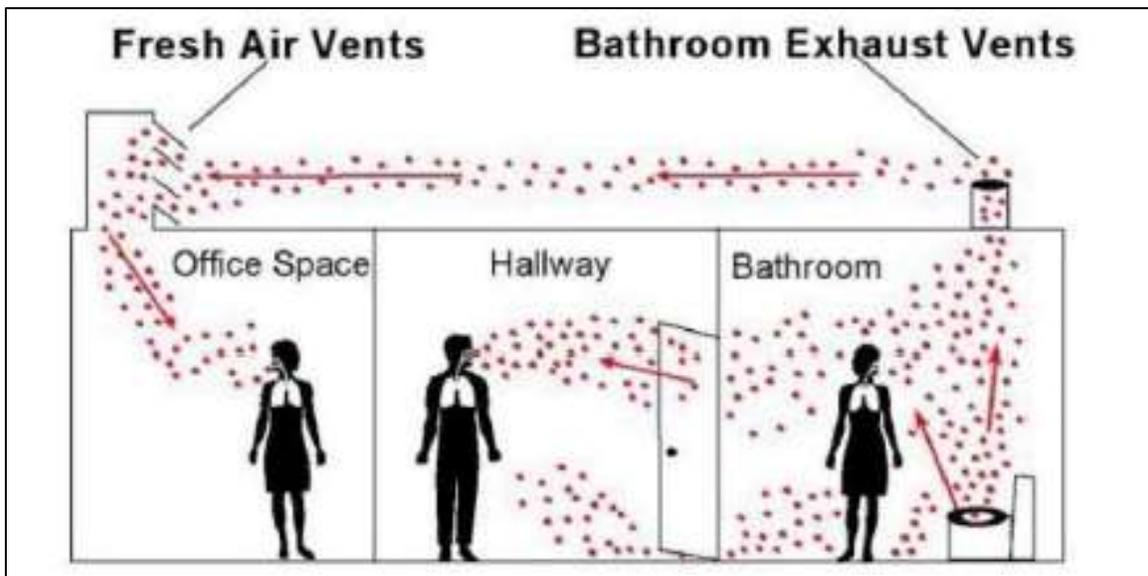
Droplet Nuclei Travel Within Buildings¹⁰

HEPA filters are NOT 100% either.

HEPA stands for High Efficiency Particulate Air. These filters are better than N95 masks in that they filter 99.97% of particles that are 0.3 microns. But just like N95 masks, some get through.

Outside air can spread disease.

Droplet nuclei in outside air can come in through fresh air vents. In addition, building exhausts can carry pathogens from within the building to the exterior – which can then recirculate back into the same or other buildings.



Infectious Droplet Nuclei Recirculation in Buildings¹⁰

A virus is not a living organism.

SARS-CoV-2 is essentially a strand of RNA surrounded by a protective layer of fat with a spike that is used to attach the virus to a host cell that has a compatible receptor. Once attached, it penetrates the cell, hijacks (mutates) the cell's machinery, and forces the cell to produce new viruses which then burst from the host cell, killing it. Once inside a cell, a virus can make 10,000 copies of itself in a matter of hours. Within a few days, the infected person will carry hundreds of millions of viral particles in every teaspoon of blood.

Since the virus is not alive and cannot be killed in the normal sense, if it doesn't find a host, it decays on its own, typically within 72 hours. During that time, it may adhere to surfaces which, if disturbed (such as shaking clothing), can release the virus back into the air where it may float for hours.

The only thing that protects the virus is a thin outer layer of fat. Anything that dissolves fat (such as soap or liquids above 65% alcohol) can break down this protective layer and accelerate deterioration. Heat also melts fat, which is why it is so good to use water above 77 degrees Fahrenheit for washing hands, clothes and everything. In addition, hot water makes more foam which increases dispersion and deterioration.

How to remove the biofilm.

Traditional Options	Pros	Cons
Scrubbing	<ul style="list-style-type: none"> • Simple 	<ul style="list-style-type: none"> • Least effective • Takes considerable effort and time • Does not work in all areas
High-pressure spraying	<ul style="list-style-type: none"> • Mechanical pressure may physically remove most biofilm molecules from surfaces 	<ul style="list-style-type: none"> • More effective, but not 100% • Not appropriate for indoors nor many surfaces • Can damage surfaces • Requires specialized equipment
Steam	<ul style="list-style-type: none"> • High temperatures dislocate and kill the cells and viruses • Manual or mechanical pressure physically removes the biofilm and most biofilm molecules from accessible surfaces 	<ul style="list-style-type: none"> • More effective, but not 100% • Not applicable for most environments • Can harm surrounding areas • Does not work well on grout • Requires specialized equipment
Enzymes	<ul style="list-style-type: none"> • Relatively safe 	<ul style="list-style-type: none"> • Moderately effective
Chemicals (e.g. strong acids, phenols, alcohols, heavy metals and surfactants)	<ul style="list-style-type: none"> • Highly effective 	<ul style="list-style-type: none"> • Can be very hazardous to health • Can damage surfaces • Can harm surrounding areas • Not applicable for most environments • Requires specialized training • Requires PPE

Secret weapon for removing biofilms – specialized probiotics.

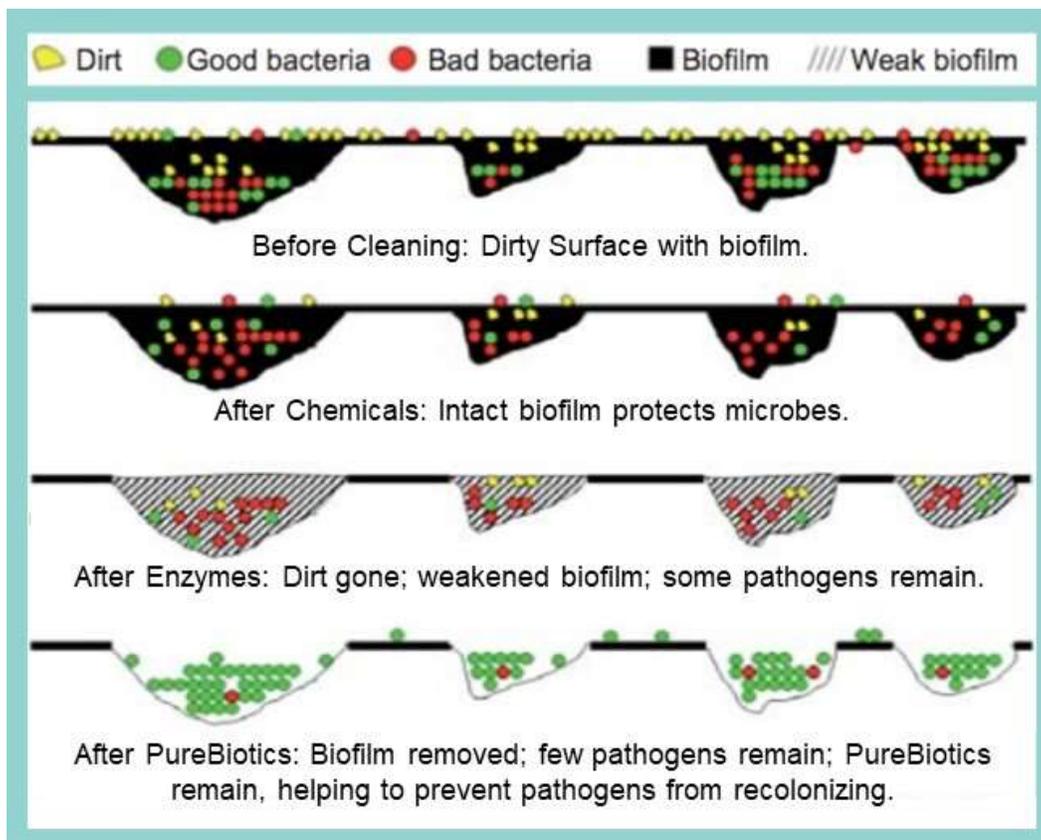
Originally designed to protect an immune-deficient infant, specially formulated probiotics (PureBiotics®) have proven to be extremely effective at helping eliminate pathogens within biofilms using the following key mechanisms:

- 1) Given that nature naturally balances bad bacteria with good bacteria, adding good bacteria helps tip the scales in favor of good bacteria, lowering the ratio of bad bacteria and statistically reducing the likelihood of infection.
- 2) By drastically increasing the competition for food, water, and space, overwhelming bad bacteria with good bacteria inhibits bad bacteria activity.
- 3) Birds in a jungle signal when a predator is spotted. Similarly, bacteria send out signals using Quorum Sensing*¹³. Introducing PureBiotics® products interrupts the normal bacterial communication, further inhibiting pathogen activity.
- 4) Perhaps most importantly, PureBiotics® degrades biofilms and over time, completely removes biofilms on almost all surfaces (including human tissue) down to the bare microscopic level. This enables pathogens and deconstructed biofilm to be washed away.

* Quorum Sensing: Bacteria communicate with each other using quorum sensing. Like a honey bee signaling to other bees that a good source of food has been found, quorum sensing is typically used to indicate essential information to other bacteria. about a great place to gather. This is important for their growth, virulence, motility and the formation of biofilms. When the bacteria gather in sufficient numbers, they start acting like multicellular organisms, form biofilms, become more aggressive and increase their mobility.

Significant drawback of other formulations.

Chemicals that kill bacteria (including biocides, antibiotics, antibacterials, and most hand-sanitizers) can trigger mutations. This has led to antibiotic-resistant superbugs, such as MRSA. Because *PureBiotics® do not directly attack bacteria*, PureBiotics® avoids the significant drawback that causes mutation.



Crucial considerations.

Although no one can claim any direct evidence that using PureBiotics® will specifically help Covid-19 patients, there is plenty of relevant evidence that it helps related microbial issues. Moreover, for over a dozen years, hospital and university studies have proven that using PureBiotics® does no harm. It has also been certified by the National Sanitation Foundation (NSF) and others.

- 1) While most disinfectants and cleaners stop working after they dry, PureBiotics® continue working for up to 72 hours, even when dry.
- 2) Independent hospital studies and clinical trials have documented effectiveness removing biofilms and cleaning and reducing:
 - a. Hospital Acquired Infections (HAI)
 - b. Harmful bacteria and other pathogens
 - c. Secondary infection risks
- 3) PureBiotics® are food-grade and safe for humans and animals
- 4) PureBiotics® use has no known deleterious side effects. They either benefit users to varying degrees or do nothing.
- 5) Though we found no direct claims by PureBiotics®, significant volumes of anecdotal evidence show PureBiotics®:
 - a. Reduces the likelihood of secondary infections connected with initial viral infections
 - b. Reduces the number of bacteria that might have viruses attached
 - c. Microscopic cleaning has a prophylactic effect on bacterial-based diseases

Key details from two hospital studies.

Hospitals have been studying PureBiotics® formulations for over a dozen years. Below are summaries from two such studies.

Hospital study #1:

A **Shriners Hospital** study demonstrated that PureBiotics® exceeded the criterion set forth in all categories based on a goal of finding new methods and solutions to:

- 1) Improve cleaning
- 2) Reduce the risk of infection
- 3) Use formulations that are safe to use directly on skin without gloves or protective gear
- 4) Eliminate adverse respiratory and allergic response in staff and patients
- 5) Reduce both material and labor costs
- 6) Reduce impact on the environment

When compared with current cleaning products, sample comments within the study concluded that “the PureBiotics® tested proved to provide far superior results in a number of ways:”

- 1) Visibly better cleaning than conventional products. So much so “that a number of the staff commented on the visible improvement in (facility) appearance.”
- 2) “There are no dangerous chemicals in the products so they can be used without protective equipment or gloves.” However, it should be noted that PPE should always be worn in any contaminated environment, even when PureBiotics® are in use or have been used.
- 3) “Eliminated the risks and impact posed by...the release of toxic fumes generated by traditional chemicals...on patients, staff, management and the public visiting the facility.”
- 4) Regarding the biofilm:
 - a. “The need to focus on cleaning and reducing or eliminating biofilm as a way of reducing bacteria load rather than trying to just kill bacteria with disinfectants was clearly demonstrated.”

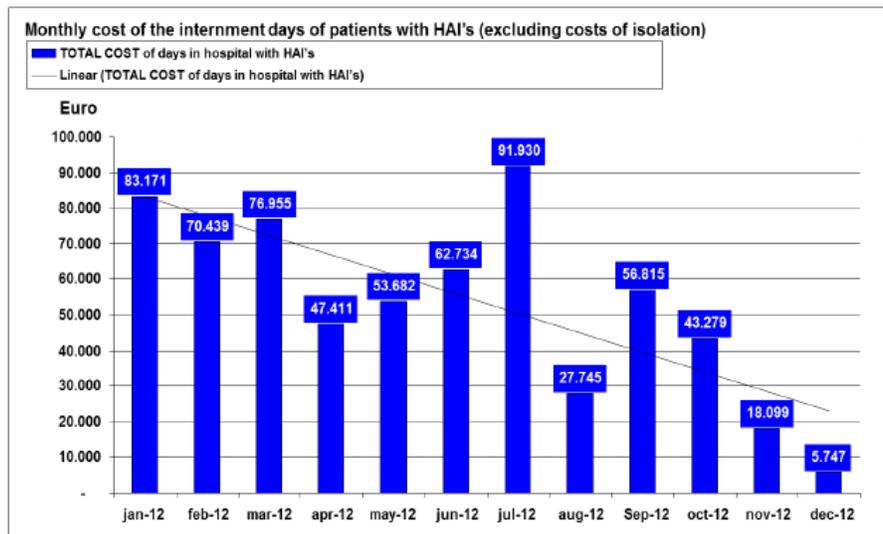
- b. While disinfectants and cleaners stop working after they dry, PureBiotics® continue working for up to 72 hours, even when dry.
 - c. “On surfaces where biofilm has been removed using PureBiotics®, the risk of MRSA and other infections dropped by a considerable factor.”
 - d. “The results of testing indicate that the efficacy of PureBiotics® was evident from the first day of the study.”
 - e. “Not only do PureBiotics® perform as well or better in keeping surfaces visually free of contamination as conventional products, but they provided the added benefit of totally deconstructing and removing biofilm down to the bare surface over a short period.”
 - f. “We did not experience any negative factors in using PureBiotics®.”
 - g. “PureBiotics® worked down to the microscopic level, actually eliminating all odor causing contamination and bacteria...there was nothing left on the surfaces to produce odors.”
- 5) Regarding Costs:
- a. “Using PureBiotics® should significantly lower the direct costs of cleaning materials” as well as a reduction in labor in facilities.
 - b. “Preventing just one hospital contracted infection per year yields a cost savings in excess of the yearly cost of using PureBiotics®. In essence, it is easy to determine that changing to PureBiotics® effectively reduces the costs of cleaning to the hospital to zero when considering cost avoidance.”

Hospital study #2:

A study at a major European Rehabilitation Hospital documented that PureBiotics® formulations can reduce pathogens as well as costs associated with HAIs.

Overall Reduction of pathogens from probiotic cleaning compared to chemical cleaning	
S. aureus	90%
Pseudomonas	82%
Candida spp.	90%
Coliforms	92%
Acinetobacter spp	78%

The comparison against hospital disinfectants was dramatic



Report on the Reduction in the Costs Patient Hospital Acquired Infections (HAI) at the same Rehabilitation Hospital further highlights the benefits

How to use PureBiotics®.

First, understand that PureBiotics® will NOT directly kill anything. Also, as noted at the top of this paper, because these products contain beneficial (good) bacteria, most disinfectant good bacteria, most cleaning chemicals will render PureBiotics® inactive.

Recommended process.

For specialized medical circumstances:

- 1) Use a disinfectant first, following manufacturer's instructions.
- 2) Wait until the chemical is completely dry before applying PureBiotics®. Otherwise, it may kill the good bacteria in PureBiotics®.
- 3) Starting with the concentrated PureBiotics® product, StaBiotic® Water Plus, shake the bottle and mix at least **one ounce** with 16 ounces of water. Use higher concentrations for major problem areas.
 - a. For home use, a spray bottle will suffice. Adjust the spray to a very fine mist and spray.
 - b. To treat larger areas such as large rooms or ductwork, use a professional fogger, adjusting it to generate the finest mist possible.
- 4) Fog larger areas, or spray on to clean specific surfaces.
- 5) There is no need to wipe dry, but if wanted, wait for a few minutes before wiping. Note that PureBiotics® should continue working for up to several days.

For subsequent day-to-day cleaning and prolonged protection:

- 1) There is no need to use a disinfectant first, unless protocol specifies otherwise, such as in a hospital or assisted living facility.
- 2) Because probiotic products are non-toxic, gloves are only required if specifically called for due to environmental conditions.
- 3) For general cleaning, use PureBiotics® All Purpose Cleaner and mix in a spray bottle as directed.
- 4) Spray on and just wipe. For heavier grime, spray on and leave for up to ten minutes and/or scrub and then wipe off. It is also a good idea to spray the PureBiotic® Mist over all areas after cleaning.
- 5) For more challenging industrial environments such as containers that store garbage or heavily soiled laundry, higher concentrations are recommended. If for animal barns, then use up to 20% product and 80% water and foam on, leave for 10 to 30 minutes and hose off.
- 6) PureBiotics® will continue working for up to several days.

To purchase PureBiotics®.

Buy directly from the manufacturer's website, <https://purebioticusa.com/>. Get a 25% discount on any PureBiotics® products by using the promotional code PROTEK25.

¹ Stability of SARS-CoV-2 in different environmental conditions. (April 2, 2020). *The Lancet*. Retrieved from [www.thelancet.com/journals/lanmic/article/PIIS2666-5247\(20\)30003-3/fulltext#coronavirus-linkback-header](https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(20)30003-3/fulltext#coronavirus-linkback-header).

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³ Biofilm. (n.d.). In *Wikipedia*. Retrieved March 25, 2020, from en.wikipedia.org/wiki/Biofilm.

⁴ Biofilms: Discovery of a new mechanism of virus propagation. (2010, February 8). *Science Daily*. Retrieved from www.sciencedaily.com/releases/2010/02/100205115946.htm.

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- ¹² Nardell, E.A. 2002. Ventilation and infectious risk. *ASHRAE IAQ Applications*, 1(1), Winter.
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