

Focus on Mitigation of Germs on Surfaces and Hands

The purpose of this paper is to discuss conventional chemical disinfectant/sanitizers and to contrast them with the emerging field of Nano Bond Composite Polymers.

COVID-19 and Surface/Skin infection control

The 2-year global COVID-19 pandemic is driving the adoption of new technologies and measures to mitigate environmental exposures to the SARS-CoV2 virus. The list includes vaccinations, masking, social distancing, new therapeutics, sanitizing surfaces and skin, and air quality. While significant prevention gains have been realized, the pandemic continues with new COVID-19 variants. Non-vaccinated, fully vaccinated, and people with natural immunity continue to be at risk of infection or re-infection.

As multiple tactics are employed, a greater focus must be placed on public wellness that includes mitigation plans for all infectious diseases. Strategies should be developed in terms of infection control, with new and improved measures to address all areas of exposure to environmental biohazards. Infection control planning needs investigation of innovative technology solutions that look beyond recommendations of government agencies, which sometimes are slow to change.

The nature of this discussion is to address infections spread through contact with surfaces, touch points, and skin. Fomites, including doorknobs, cell phones, school desks, water fountains, and toilet hardware, all are examples of potential pathways for the transmission of germs. MRSA, for example, can be contracted from surfaces. Influenza, Coronavirus, Norovirus, and others may last on surfaces from a few hours to days. This applies to porous and non-porous surfaces. The Journal of Hospital Infection, Vol 104, Issue 3, P246 – 251, March 01, 2020, states that in the analysis of 22 studies, human coronaviruses “can persist on inanimate surfaces like metal, glass or plastic for up to 9 days”.



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The COVID-19 crisis demands frequent sanitizing of objects and hands. With the application of conventional chemical-based sanitizers/disinfectants, this has been the best approach given the limitations of traditional chemicals. While products utilizing alcohol, chlorine, peroxide, and quaternary ammonium compounds yield strong kill rates for bacteria and viruses, no protection continues once the wet chemical dries. Recognizing this limitation, constant reapplication is expensive and futile for achieving the goal of round the clock disinfection. This statement applies to surfaces and hands.

Another important aspect of using chemical-based disinfectants is to be aware of the required “Dwell Time” stated by the manufacturer. Dwell time is how long the chemical must remain wet on surfaces for complete efficacy as prescribed. It is important that the proper amount of chemical be applied for the minimum drying time demanded by the label. If an application rate is too light, the complete bactericidal/viricidal kill rates will be diminished. To the non-professional, this critical fact is often an unknown.

Nano Bond Composite Polymers

The constant need for reapplication of conventional disinfectants is driving interest in the field of Nano Bond Composite Polymers. This also may be referred to as polymer coatings. Frequent use of traditional chemicals cannot offer 24/7 protection from pathogens, especially viruses. The extreme worldwide COVID-19 death toll demands new technologies for mitigating exposure through continual protection on surfaces and skin. The technological answer is *Nano Bond Composite Polymers*.

Nano polymers available in this field are segmented and offer a mix of chemistries. Many brands can only be considered bacteriostatic while a small portion also have bactericidal/viricidal properties. Most chemistries are silane quat based or referenced as Organosilanes. Others may include silver/nanosilver, titanium oxide, zinc oxide, quaternary ammonium compounds, etc. Many Organosilane brands as mentioned create a long-lasting covalent bond with bacteriostatic properties but lack sufficient kill rates to be classified as a disinfectant. Various companies claim 90-day persistence but fail to present documentation that substantiates kill rates for bacteria and viruses. Offerings that are only Silane Quat/Organosilane formulations, can only be considered



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biostatic since they will not produce kill rates required to be labeled as disinfectants. Regarding the EPA, products in this category will not receive approval as a disinfectant.

My-Shield® Nano Composite Polymer Disinfectants

My-Shield® with Zetrisil is an ESC Brands line of products in the Nano Polymer category for surfaces and skin. My-Shield® Broad Spectrum Disinfectant and Hospital Disinfectants are approved by the EPA and “N” list registered. My-Shield® Hand Sanitizer, Sanitizing Soap, Topical Antiseptic, Wipes, etc., are all water-based formulations with Zetrisil and FDA registered.

Clinical data from multiple laboratory studies yield:

- Bactericidal/viricidal kill claims matching conventional chemicals
- Long lasting persistent effect with continued kill rates after drying

Standard disinfectants have no lasting protection once the dwell time is reached and surfaces are dry. My-Shield® provides bactericidal/viricidal kill rates while wet and dry.

The My-Shield® water-based silicon nano polymer offers a level of continued mitigation to pathogens on surfaces that simply cannot be matched by chemical-based disinfectants!

My-Shield® with Zetrisil®

Zetrisil® is a descriptive name of the unique, nano polymer technology including:

- *Zeta Potential* – the strong positive charge that attracts negatively charged germs
- *Tri-kill* – Electromagnetic attraction, Electrocution, Mechanical piercing/puncturing germs
- *Silicon* – Silicon polymer that forms a covalent bond with surfaces

My-Shield® with proprietary Zetrisil® chemistry is an Organosilane formulated with Quaternary Ammonium molecules embedded in the matrix of silicon-based polymers. Ammonium quat molecules are forced into the microorganisms that land on the treated surfaces which achieves high kill rates. My-Shield®



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formulations for surfaces (EPA) and skin (FDA) differ but are based on the same Zetrissil technology.

Kill Claims with Persistence

Table 1 contains kill rates from published clinical laboratories using GLP standards for My-Shield® Surface and Skin products with persistence results. Copies of lab reports are available upon request.

Table 1

My-Shield® Broad Spectrum and Hospital Disinfectant:

- 99.999% microorganisms including bacteria, viruses, fungi
- 28 days persistence
- 99.99% COVID-19 at 30 days
- 99.95% COVID-19 at 90 days
- 99.95% SARS-CoV-2 at 49 days

My-Shield® Hand Sanitizer:

- 99.99% Bacteria & Viruses
- 4 – 8 hours high level of protection after application
- COVID-19 kill rate 30 seconds at 99.9%

My-Shield® Laundry Complete:

- 99.99% kill rate
- 28 days persistence bacterial viruses
- COVID-19 kill rate 99% at 200 days after application

Alcohol Based Hand Sanitizers

The US FDA monograph currently has 3 approved active ingredients for hand sanitizers including:

- Ethyl Alcohol
- Isopropyl Alcohol
- Benzalkonium Chloride



The majority of hand sanitizers in the US market are alcohol-based products which have been available for decades. Recognition of the harmful effects of alcohol on skin, bogus products, and flammability/storage issues are all driving public interest in alcohol free formulations. The remaining FDA approved chemical, Benzalkonium Chloride (BZK), requires only a fraction of the minimum 60 to 70 percent concentration required of Ethyl and Isopropyl Alcohol. While the CDC continues the default recommendation of alcohol, BZK is increasingly being used as an effective antimicrobial agent for bacteria and viruses that rivals the efficacy of alcohol. Alcohol products offer no protection against enveloped viruses such as Norovirus or bacterial spores such as those that spread the super bug C-Diff. Infection control measures in health care require repeated application of alcohol hand sanitizers. This destroys the outer, protective layer of the membrane in skin cells. Hands are left irritated, cracked, and dry.

As noted with chemical surface disinfectants, alcohol-based hand sanitizers have no remaining protection once dry.

My-Shield® Hand Sanitizer

My-Shield® Hand Sanitizer is a Zetrisil based product that employs the tri-kill technology described above. This formulation has a higher Silane/quat concentration than the surface products for enhanced sticking power to skin. BZK is the ammonium quat bound to the silicon-based polymers on skin. Alcohol free foaming and gel versions are available, each including Aloe Vera.

Once applied and dry, protection continues for up to 24 hours with a high kill rate for 4 – 8 hours. Clinical studies citing persistence results are available.

For more information, please visit: www.GermfreeInnovations.com.