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Surface Disinfection: BioSURF Surface Disinfectant Outperforms All Current Competitors

Gordon's Clinical Observations: There has been a major void in infection control in the U.S. for several years since Lysol Spray lowered the ethyl alcohol in its formulation. The May 2017 *Clinicians Report* included an article on pre-wet wipe surface disinfectants that may have frustrated you because of the lack of adequate products. Research just completed by TRAC Research, the human studies division of CR, has identified the plant-based BioSURF disinfectant that has a kill potential similar to the old very potent original formulation Lysol Spray. *You, your staff, and your patients will benefit from this very new information.*


Bag-in-a-Box dispensing of BioSURF

TRAC RESEARCH

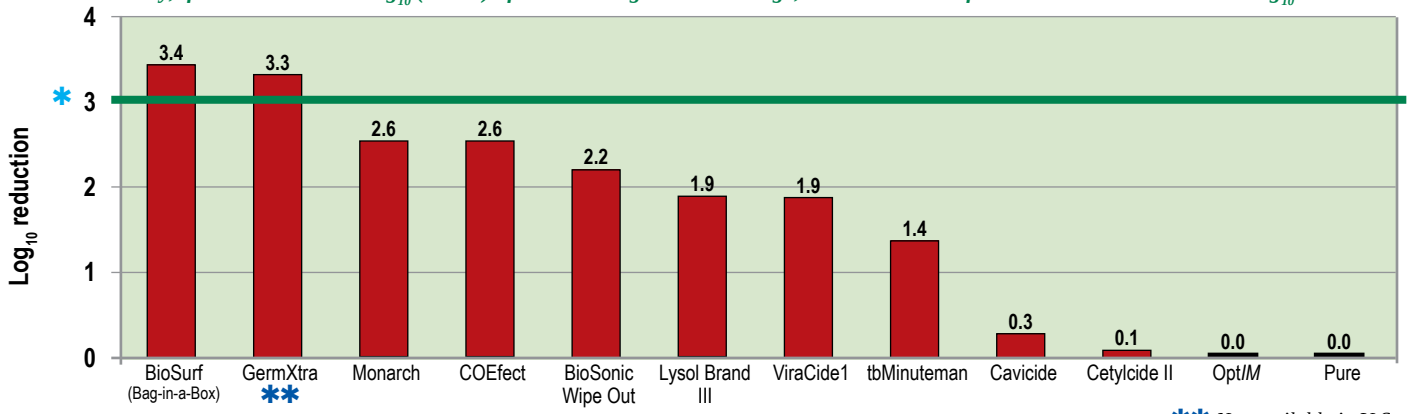
Current pre-wet disinfectant wipe formulations are convenient, but have been shown to spread rather than kill pathogens contained within complex human proteins always shed during dental procedures *(blood, saliva, crevicular fluid, pus, etc).* To achieve the thorough, fast microbe kill expected by patients and clinicians on clinical surfaces, **there are three components of surface disinfection that must be present, effective, and compatible with each other. These components are: (1) The disinfectant formulation, (2) The packaging and dispensing, (3) The wipe material.** After 40+ years of a worldwide search that includes extensive microbial testing of now 190+ products, one has finally met the necessary essentials in all three surface disinfectant components. **The following report describes and lists steps in use of the newest BioSURF environmental surface disinfectant.**

1. THE DISINFECTANT FORMULATION: ethyl alcohol and chlorhexidine gluconate chemistry

- Since 1976, we have defined "efficacy" of healthcare disinfectants as fast, broad-spectrum kill of **poliovirus1** and ***Mycobacterium bovis* bacteria (TB) in the presence of at least 10% fresh human whole blood**. These test organisms were selected because both are difficult to inactivate with chemicals. Fresh human whole blood was placed in the test system because it is a challenge faced clinically daily. Industry has avoided this challenge because most disinfectants are neutralized by it. **Disinfectant companies know their products fail to kill if complex body fluids are present. For years they have put clinicians at high risk by directing to clean *before* disinfecting. This dangerously places the cleaning personnel in harm's way.**
- **It is imperative that disinfectants simultaneously kill and clean.**
- Over the years, our tests identified original formulation Lysol Disinfectant Spray and GermXtra as products that met the above criteria—earlier iterations of BioSURF did not. However, Lysol and GermXtra were dispensed as spray-ons which created irritating aerosols, and neither were sold with a compatible wipe, which meant incompatible wipe materials were often chosen unknowingly by staff.
- **In January 2017, BioSURF plant-based formulation using a modified production process became available.** The graph below compares results of testing this BioSURF dispensed directly from its novel "Bag-in-a-Box" packaging compared to other products tested.

FIGURE 1: Kill potential within *3 minutes* of 12 surface disinfectants on poliovirus1 in the presence of 10% fresh human whole blood.

* *Generally, if a chemical kills 3 log_{10} (99.9%) of a million organism challenge, it can claim disinfection. Green line indicates 3 log_{10} kill.*



** *Not available in U.S.*

Summary of Graph:

- **Only BioSURF Bag-in-a-Box and GermXtra from a freshly opened container killed poliovirus1 in the presence of 10% fresh human whole blood within 3 minutes. BioSURF is EPA registered in the U.S., but GermXtra is not *(both are registered in Canada and some other countries).* BioSURF active ingredients are 70.5% ethyl alcohol and 0.2% chlorhexidine gluconate *by weight*, or 84% ethyl alcohol and 0.2% chlorhexidine gluconate *by volume* at 60°F.**

Surface Disinfection: BioSURF Outperforms All Current Competitors *(Continued from page 1)*

2. THE PACKAGING AND DISPENSING: Bag-in-a-Box

Bag-in-a-Box sealed delivery preserves disinfectant from air exposure degradation. To obtain full kill potential, the liquid should be dispensed directly onto a non-interfering wipe before each use.

Pump spray bottle dispensing is less desirable because it draws in air to displace the liquid as spray. This exposes contents to air degradation and decreases kill potential unless contents are fully used and fully replenished each day.

- **Kill potential of all disinfectant formulations decreases when exposed to air. Once the manufacturer's seal is broken, degradation begins.**
- Pre-wet wipe dispensing makes no pretense of seal, and pump spray bottles draw in air to displace the liquid as spray. Once opened, both methods of packaging and dispensing cause gross loss of disinfectant kill potential over time. **This degradation problem is overcome by Bag-in-a-Box delivery**, which is a system long present in the wine industry to preserve wine chemistry and flavor.
- The efficacy of liquid in Bag-in-a-Box dispensing is maintained because the liquid is sealed within an air-tight bag that collapses on itself as the liquid volume decreases during use.
- **For clinicians to obtain full kill potential from BioSURF, they should dispense the disinfectant directly onto a non-interfering wipe material just before each use.**
- If clinicians insist on using a pump spray bottle, contents should be fully used then fully replenished *each day* to maintain kill potential *(start with empty bottle each day).*

BioSURF Bag-in-a-Box 5 liter bag = $80 U.S.
U.S.—order from PureLife Dental at *www.purelifedental.com*
Canada—order from local dental dealers

3. THE WIPE MATERIAL: LeCloth Dry Wipes

LeCloth Dry Wipes are a separate product sold by the same company selling BioSURF. They are dispensed from a canister identical to those used for current generation pre-wet wipes, but they contain no liquid. **Ideally, LeCloth Dry Wipes *are wet with BioSURF just before each use and discarded after each operatory clean-up, to achieve maximum disinfectant kill.*** LeCloth Dry Wipes characteristics:

- Do not interfere with BioSURF kill.
- Biodegradable.
- Do not disintegrate during vigorous cleaning.
- Can be re-wet frequently to keep disinfectant delivery high during disinfection of an operatory.
- Discarded after each operatory clean-up as regular waste.
- 7"x 9" dimensions are convenient sizing.

LeCloth Dry Wipes = $55/Case *(8 rolls of 100 wipes per roll)*
U.S.—order from PureLife Dental at *www.purelifedental.com*
Canada—order from local dental dealers

4. CLINICAL TECHNIQUES for BioSURF use

DISPENSING: Two possible methods

METHOD 1: Dispense from Bag-in-a-Box directly onto wipe. ***(Preferred)***

- Set up the system as pictured. *(Note: the white bowl and glass pan are kitchenware and were purchased separately locally.)* This placement positioning for the BioSURF box facilitates dispensing from the top of a counter.
- Loosely ball up 1 or several LeCloth Dry Wipes and open faucet holding wipes very close to orifice, allowing excess to drip into the bowl.

METHOD 2: Dispensing from Bag-in-a-Box into spray bottle.

- Position Bag-in-a-Box on counter edge and dispense into a pump spray bottle. Spray from pump bottle directly onto LeCloth Dry Wipes, wetting generously and allowing excess to drip onto counter to be wiped.
  (Do not spray directly onto surfaces. Fully fill bottle with fresh disinfectant daily.)

Application Steps:

1. Generously wet LeCloth per Method 1 *(preferred)* or Method 2 shown at left. Spread disinfectant evenly and generously and scrub to remove visible debris. Re-wet LeCloth generously as needed, as you proceed.

2. Allow disinfectant *3 minutes* on surfaces to obtain penetration into soil and oral proteins and kill organisms within. *Less than the 3 minute contact time can diminish kill since this disinfectant is killing organisms within soil and oral proteins.*

3. OPTIONAL STEP. If streaking occurs on dark surfaces—*damp-wet* a paper towel with BioSURF and wipe surface quickly to produce even, shiny appearance as a last step, *AFTER* completing the 3 minute disinfection steps above.

Some types of rubber, plastic, paint, and naugahyde may not tolerate regular use of this high ethyl alcohol-chlorhexidine formulation. Clinicians should consider replacing items that will not tolerate effective disinfection after each patient, or use barriers for those items.

TRAC RESEARCH CONCLUSIONS: BioSURF is the first, and currently only U.S. EPA registered, surface disinfectant with the combination of:

(1) 3 minute broad spectrum kill in the presence of fresh human whole blood.
(2) Packaging designed to eliminate loss of kill potential due to air exposure by use of the wine industry's Bag-in-a-Box delivery.
(3) Dispensing that prevents aerosol generation.
(4) A wipe that does not interfere with the disinfectant's kill potential.
(5) Biodegradability of all materials in the system.

Evaluators stated the box needs: (1) to be more sturdy, (2) a built-in collection bowl to catch overflow, (3) a more positive seat for the faucet.

What is CR?

WHY CR?

CR was founded in 1976 by clinicians who believed practitioners could confirm efficacy and clinical usefulness of new products and avoid both the experimentation on patients and failures in the closet. With this purpose in mind, CR was organized as a unique volunteer purpose of testing all types of dental products and disseminating results to colleagues throughout the world.

WHO FUNDS CR?

Research funds come from subscriptions to the Gordon J. Christensen Clinicians Report®. Revenue from CR's "Dentistry Update®" courses support payroll for non-clinical staff. All Clinical Evaluators volunteer their time and expertise. CR is a non-profit, educational research institute. It is not owned in whole or in part by any individual, family, or group of investors. This system, free of outside funding, was designed to keep CR's research objective and candid.

HOW DOES CR FUNCTION?

Each year, CR tests in excess of 750 different product brands, performing about 20,000 field evaluations. CR tests all types of dental products, including materials, devices, and equipment, plus techniques. Worldwide, products are purchased from distributors, secured from companies, and sent to CR by clinicians, inventors, and patients. There is no charge to companies for product evaluations. Testing combines the efforts of 450 clinicians in 19 countries who volunteer their time and expertise, and 40 on-site scientists, engineers, and support staff. Products are subjected to at least two levels of CR's unique three-tiered evaluation process that consists of:

1. Clinical field trials where new products are incorporated into routine use in a variety of dental practices and compared by clinicians to products and methods they use routinely.
2. Controlled clinical tests where new products are used and compared under rigorously controlled conditions, and patients are paid for their time as study participants.
3. Laboratory tests where physical and chemical properties of new products are compared to standard products.

Clinical Success is the Final Test

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CRA Foundation® changed its name to CR Foundation® in 2008.

This team is testing resin curing lights to determine their ability to cure a variety of resinbased composites.

Every month several new projects are completed.

THE PROBLEM WITH NEW DENTAL PRODUCTS.

New dental products have always presented a challenge to clinicians because, with little more than promotional information to guide them, they must judge between those that are new and better, and those that are just new. Because of the industry's keen competition and rush to be first on the market, clinicians and their patients often become test data for new products.

Every clinician has, at one time or another, become a victim of this system. All own new products that did not meet expectations, but are stored in hope of some unknown future use, or thrown away at a considerable loss. To help clinicians make educated product purchases, CR tests new dental products and reports the results to the profession.