AntimicrobialTestLaboratories LLC

Disinfectant Development Specialists

Comparison of the Efficacy of two Broad-Spectrum Disinfectants:
US-Based Microgen DISNFX D-125™ and European-Based DuPont Virkon™

Review by Benjamin Tanner, Ph.D, 1/30/08

Reviewer Background:

Benjamin Tanner is the president of Antimicrobial Test Laboratories, a commercial microbiology laboratory. He holds a Ph.D. in Microbiology and Immunology and has worked in the disinfectant industry for several years. Before launching Antimicrobial Test Laboratories, he worked as a microbiologist for the Clorox Company (Oakland, CA), developing disinfectants and other antimicrobial consumer products.

Purpose of the Review:

This document is not intended to be an exhaustive scientific review of the two products considered. Rather, it is meant to expose disinfectant purchasers and infection control decision-makers to the views of a microbiologist who has studied disinfectant testing and disinfectants for many years in industry and academia. This is important because much of the efficacy data for the two products under consideration has been generated using *drastically different* microbiological testing methods. This document also presents the reviewer's views on some other pertinent aspects of the disinfectants - namely their chemical stability and general surface and user safety profiles.

Overview of the US-based and European-based, Broad-Spectrum Disinfectants:

Microgen, Inc. sells DISNFX D-125™, which is a dilutable, quaternary ammonium disinfectant. It was developed and tested primarily in the United States using test methods acceptable to the United States Environmental Protection Agency (USEPA). It is marketed in the United States and abroad. This product has been shown to kill bacteria, viruses, and fungi at a 1:64 dilution with a contact time of 10 minutes.

DuPont sells Virkon, which is a solid, dilutable, potassium peroxymonosulfate and sodium chloride-based disinfectant. It has been tested primarily by European suspension-based test methods. This product has been shown to kill bacteria and fungi at a 1:100 (w/v) dilution within 10 minutes, and viruses at a 2:100 dilution within 10 minutes (2).

Review of Testing Protocols Used to Generate Efficacy Data:

- United States EPA-required "hard surface carrier" tests, including the AOAC Use-Dilution and Germicidal Spray Products Tests – these tests are the most challenging, since *complete* kill of a concentrated, dried film of microorganisms (10,000 - 9,999,999 microbes per test surface) is required on either 10/10 or >58/60 individual test surfaces, depending on the product label claim.
- European "suspension-based" methods accepted by organizations such as the European Committee for Normalization (CEN) – these tests are less challenging because the microorganisms are tested in suspension, meaning that they are subject to the action of the disinfectant continuously and on all sides at once. Furthermore, most European suspension-based test methods require that only a percentage (typically 99.999%) of microorganisms is killed by the product.

Approximate Percent of Claims from "Hard-Surface Carrier," "Suspension" or "Other" Methods.

- DISINFX D-125™ : AOAC Use-Dilution and/or Germicidal Spray Products Tests, or "hard surface carrier tests" [100% of US and international microbial claims (1)].
- Virkon™ : AOAC Use-Dilution and/or AOAC Germicidal Spray Products Tests, or "hard surface carrier tests" [~40% of international microbial claims(5)]; "Suspension-Based Test" [~50% of international microbial claims (5)]; Minimum Inhibitory Concentration (MIC) and other miscellaneous testing [~10% of international microbial claims (5)].

Review of Product Efficacy

- DISINFX D-125™: The US-tested D-125™ disinfectant efficacy data summary sheet (EPA master label) consists of more than 135 microbial kill-claims, generated entirely by hard surface carrier test methods (1). Most of these kill claims specify a 10 minute contact time for disinfection.
- Virkon™: The Virkon™ disinfectant efficacy data summary sheet (meant for international marketing) consists of numerous microbial kill-claims, generated by a variety of different test methodologies, many of which are less challenging than USEPA-required hard surface efficacy tests (5). The Virkon™ USEPA master label lists approximately 20 microbial kill-claims, but specifies that the concentration of the product be doubled to 2% for disinfection of viruses. The Virkon™ USEPA master label specifies a 10 minute contact for disinfection.

Review of Product Stability:

- DISINFX D-125™ : Stable for up to 64 days in a sealed container (1).
- Virkon™ : Stable for up to 7 days in a loosely capped container (2)

Review of Product Interaction with surfaces:

- DISINFX D-125™ : Safe for use on most surfaces (1).
- Virkon™ : Safe for use on most surfaces, with the exception of metals such as aluminum, copper, or brass (2).

Review of Product Safety:

- DISINFX D-125™: Generally safe diluted. May corrode or irritate the skin, eyes, and digestive tract (3).
- Virkon™ : Generally safe diluted. May corrode or irritate the skin and eyes. May cause respiratory problems. May produce free halogen gasses (such as chlorine gas) if exposed to common chemicals in concentrated form (4). Protective equipment is recommended for handling concentrate (4).

References:

1. Microgen D-125™ USEPA Master Label. May 17, 2007. Downloaded 1/30/08. (http://www.microgeninc.com/milestones/PDF/D-125%20Master%20Label.pdf)
2. Virkon™ USEPA Master Label. July 27, 2006. Downloaded 1/30/08. (http://www.buyrelyonhere.com/documents/Virkon%20Master%20Label%20for%20NLomax.pdf)
3. Microgen D-125™ MSDS. Downloaded 1/30/08. (http://www.microgeninc.com/milestones/PDF/D-125%20MSDS%20EN.pdf)
4. Virkon™ MSDS. Downloaded 1/30/08. (http://www.rmsupply.co.uk/VirKon_MSDS_Sheet.PDF)
5. Virkon™ Efficacy Summary Sheet (Includes International Claims/Tests). Downloaded 1/30/08. (http://www.buyrelyonhere.com/documents/mdcefficacy.pdf)