

AntimicrobialTestLaboratories LLC

●●●●●● Disinfectant Development Specialists

Independent Scientific Review of ATS-LABS Study # A02098

Review by Benjamin Tanner, Ph.D, 2/29/08

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.

Summary of the Study:

The test report for study #A012098 (Microgen, Inc) is based on a study method that has been deemed acceptable to the United States Environmental Protection Agency for demonstrating residual sanitizing activity on hard, non-porous surfaces. This particular test method is just one way of demonstrating residual sanitizing activity, and is most certainly a "worst-case" test method, meaning that test substances undergo an extraordinary series of microbial inoculations, as well as multiple "wet" and "dry" physical abrasion/wear cycles.

The study was carried out, briefly, as follows:

- 1) Cultures were grown and dried onto steel test surfaces
- 2) Test surfaces were treated with product and allowed to dry
- 3) Test surfaces were subjected, repeatedly, to alternating "wet" and "dry" physical abrasion cycles over the course of many days
- 4) Test surfaces were re-challenged with a high level of microorganism
- 5) Residual "self-sanitizing" activity was determined as a percent reduction.

Interpretation of Study Results:

This particular study would be extraordinarily challenging for any disinfectant chemical to "pass," due to three main factors. First and foremost, the test method involves multiple "wet" and "dry" wear cycles over the course of multiple days, increasing the likelihood of lab errors, which will usually work against the products tested (indeed, variability was quite high for this study, with greater than 2 log₁₀ (99%) variability present between identical replicates in some cases). Second, the product was tested against an extraordinarily high concentration of *Enterobacter aerogenes*, which may have been responsible for the lack of appreciable self-sanitizing activity against this organism. The concentration of *E. aerogenes* used for the study was high enough to invalidate test results at many commercial test laboratories, though guidance from the EPA on this matter is not readily available. Lastly, the report clearly states that the study was not initiated until two full days after the initial application of the test substance.

The study report indicates that D-125 has appreciable self-sanitizing activity against *S. aureus* if allowed to dry on a surface. The report states that lot #H063031 achieved a >99.9% reduction, which is the percent reduction corresponding to "sanitization" by the US EPA. The other lot tested for the study (#H042831) also showed residual self-sanitizing activity to a lesser, but still relevant, extent (>99.5% reduction after multiple wear cycles). When all the data is considered together, an appropriate conclusion is that D-125 product does, in fact, provide a substantial residual decontaminating effect against *S. aureus* when allowed to dry onto a surface.

Conclusions:

The D-125 product demonstrated substantial residual self-sanitizing activity against *S. aureus*, with one lot of product achieving >99.9% reduction and the other achieving >99.5% reduction. Results for *E. aerogenes* were not as encouraging, but levels of this organisms used for the study were remarkably and unusually elevated, and there was a great deal of variability evident in this study, suggesting that future tests may produce more encouraging results.