Theoretical and experimental aspects of microbicidal activities of hard surface disinfectants: Are their label claims based on testing under field conditions?

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ABSTRACT

Seven disinfectant products were tested against standard strains of *Staphylococcus aureus* and *Pseudomonas aeruginosa* to determine whether their label conditions could be realistically complied with in real-world applications. The findings indicate that AHP® was the sole product tested with a contact time shorter than its dwell time.

BAKGROUND

With the high prevalence of healthcare-associated infections across facilities worldwide, the need for proper cleaning and disinfection protocols are imminent. Many test methods used to validate the efficacy of disinfectants, such as those conducted by the United States Environmental Protection Agency (EPA) and Health Canada, may not accurately reflect field conditions. This report examined theoretical aspects of field conditions such as temperature and dilution rates, and their effect on efficacy.

STUDY

The study tested 7 disinfectant products, including accelerated hydrogen peroxide (AHP®), a quaternary ammonium compound (quat), a quat/alcohol mixture, a bleach product, an alcohol/quat/phenol blend, a concentrated phenol, and quat mixed with 60% ethanol. The test organisms included standard strains of *Pseudomonas aeruginosa* (*P. aeruginosa*) and *Staphylococcus aureus* (*S. aureus*). Disinfectants were tested for drying time, wettability, and bactericidal activity.

RESULTS

All products dried within 4 minutes, with the alcohol-based products drying significantly faster. The quat product and the phenol product had a 10-minute contact time, but dried in less than 4 minutes and did not achieve the necessary 6-log reduction to disinfect. The AHP®-based product dried in 3 minutes, but achieved its 1-minute contact time. The quat/alcohol and phenol/alcohol products were ineffective and dried in less than 1 minute. Most chlorine-based bleaches do not contain surfactants, and are therefore incapable of completely wetting the surface. Similarly, the quat and phenol solutions failed to adequately wet the surfaces. AHP® achieved the best overall efficacy against both *S. aureus* and *P. aeruginosa.*

CONCLUSION

AHP® was the only product tested with a contact time that did not exceed its drying time. It is likely for this reason that AHP® achieved the best efficacy against *S. aureus* and *P. aeruginosa.*

IMPLICATIONS FOR AHP®

AHP® is one of the few chemical disinfectants that stays wet for the duration of its contact time. This sets AHP® apart from competitive products, since this ability to stay wet within the confines of its contact time is a defining feature of its efficacy. In many real-world

settings, users may not reapply a disinfectant to keep the surface wet throughout the duration of the contact time, rendering the product ineffective. With AHP®, reapplication is unnecessary, making compliance far more realistic.

REFERENCE

Omidbakhsh N. (2010). Theoretical and experimental aspects of microbicidal activities of hard surface disinfectants: are their label claims based on testing under field conditions? Journal of AOAC International. 93(6), 1-8.

TABLE 1

	Blank	100% Soil	TB US - 1	TB US - 2	TB US - 3	Prev. -1	Prev. -2	Prev. -3
5-Fluorouracil	< 5.0 ng	40.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Cyclophosphamide	< 5.0 ng	65.6 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Doxorubicin HCl	< 5.0 ng	30.6 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Epirubicin HCl	< 5.0 ng	431.2 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Etoboside Phosphate	< 5.0 ng	25.8 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Ifosfamide	< 5.0 ng	47.2 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Irinotecan HCl <	< 5.0 ng	45.6 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Methotrexate	< 5.0 ng	24.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Paclitaxel	< 5.0 ng	7.5 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng
Vincristine Sulfate	< 5.0 ng	40.8 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng	< 5.0 ng