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Surface Disinfectants and label claims: Realistically can contact times be met to achieve antimicrobial efficacy?

Background:

The number of infections continues to rise in North American and around the world. The use of disinfectants is an important part of all healthcare facilities infection control practices. Most disinfectants are applied to surfaces, and allowed to air dry. For disinfection to occur, it is important for a product to keep the surface wet for the entire disinfection contact time as noted on the label in order to achieve the claimed disinfection activity.

Objective:

The objective of this study was to determine the efficacy of several different disinfectant chemistries against common pathogens using a realistic contact time for each chemistry based on its evaporation rate and compare the results to the efficacy claims listed on the product labels.

Methods:

In this study, several disinfecting chemistries including Accelerated Hydrogen Peroxide (AHP) 0.5%, bleach 500 PPM, a quat, 600 PPM, a quat-alcohol (0.3% quat & 17% alcohol), a phenol, 700 PPM, and alcohol-phenol (70% alcohol, 0.3% phenol) were tested for their drying time on a surface, and then tested for their antimicrobial activity at their drying time against *S. aureus*, *P. aeruginosa*, and *MRSA*, as representative bacteria using a quantitative carrier test method with the criteria of at least 6 log reduction to pass.

Results:

All tested products dried in less than 5 min contact time with alcohol-based products drying significantly faster than any other chemistry (p-value of 0.000) (Figure 1). Quat and phenol carried a label claim of 10 min, but dried at less than 3-4 min, and those contact times, they were found ineffective. AHP dried at 3-4 min, regardless it was still efficacious, even at 1 min contact time (Figure 2). Bleach dried at 3-4 min, and it was marginally efficacious (Figure 3). Quat/alcohol, and phenol/alcohol dried at less than 1 minute, and were not effective (Figure 4).

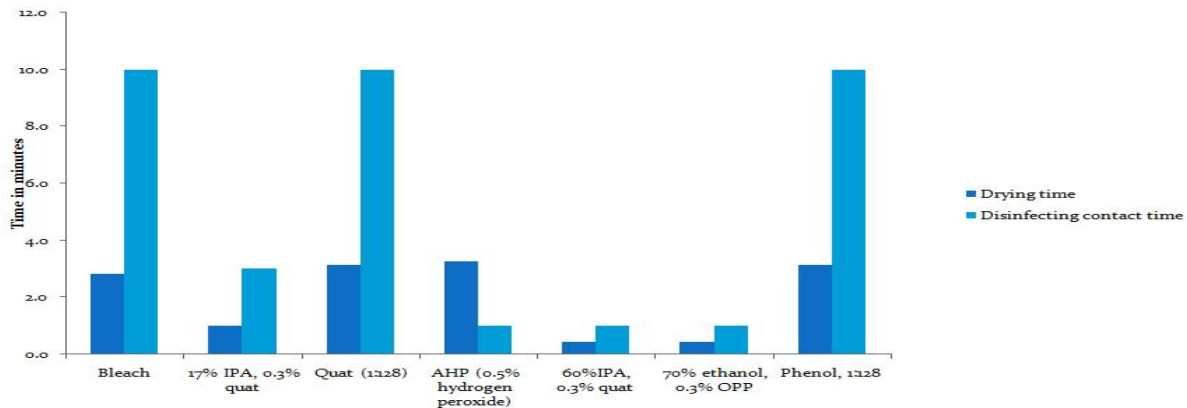


Figure 1: Drying Time versus Disinfectant Contact time



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Chemistry	Dry time	Label claim	<i>Staphylococcus aureus</i>	<i>Pseudomonas aeruginosa</i>	MRSA
0.5% AHP	3 min	1 min	6.67	7.13	6.3

Figure 2: Chemistries that Achieve Kill before they Dry

Chemistry	Dry time	Label claim	<i>Staphylococcus aureus</i>	<i>Pseudomonas aeruginosa</i>	MRSA
Bleach, 1:100	3 min	10 min	6	5.9	6

Figure 3: Chemistries that Marginally Kill before they Dry

Chemistry	Dry time	Label claim	<i>Staphylococcus aureus</i>	<i>Pseudomonas aeruginosa</i>	MRSA
17% IPA, 0.3% quat	1 min	3 min	5.9	6	3.7
Quat (1:128)	3 min	10 min	<2	<2	<2
60%IPA, 0.3% quat	30 sec.	1 min	<2	<2	<2
70% ethanol, 0.3% OPP	30 sec.	1 min	1.59	<4	5.13
Phenol, 1:128	3 min	10 min	<2	2.52	<3

Figure 4: Chemistries that Dry before they Kill.

Conclusion:

The results showed that it is not possible in practice to meet the required contact time for slow acting disinfecting products, and the products with no gap or less gap between their claimed contact time, and drying time have a significantly better chance of achieving their required level of decontamination.