

A Safer Decontaminating Solution?

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THERE ARE MANY ways to promote safety in the laboratory, from wearing personal protective equipment and utilizing fume hoods to wiping up spills and labeling chemicals. But one that is commonly overlooked is the choice of decontaminant used to clean equipment and surfaces.

Most laboratories use bleach to kill biological contaminants, but just how safe and effective is this approach? Is there something better out there? To find out, the National Forensic Science Technology Center (NFSTC) recently conducted a study comparing a new product, STERIPLEX SD, manufactured by sBioMed LLC, to a 10% solution of Clorox regular chlorine bleach.

This study was funded by the National Institute of Justice (NIJ) and conducted at NFSTC's laboratory facilities in Largo, Florida. (The full report can be viewed at the link posted at the end of this article.)

Better than Bleach?

Perhaps the most common product for cleaning laboratory surfaces and instruments is bleach solution. Bleach is inexpensive (~\$3.00/gal.) and can be purchased virtually anywhere, but it is also toxic and corrosive. It should not be inhaled or come into contact with skin, and when applied to surfaces or instruments, it must be followed up with distilled or purified water to avoid long-term damage such as pitting. Furthermore, bleach solution loses its effectiveness after 24 hours, so fresh dilutions must be prepared daily. This is an unpleasant and time-consuming chore for laboratory personnel since a number of bottles of bleach solution are required each day for a typical laboratory.

STERIPLEX SD is a new product that is specifically designed to decontaminate laboratory surfaces and instruments. The solution comes in two parts and, according to the manufacturer, is sporicidal and bactericidal for 60

days after activation. Its MSDS health hazard rating is 0 (No hazard), and it has no toxic fumes, no emissions into the environment, and no corrosive chemicals. At the time this study was conducted, its suggested retail price was \$44.95/gal.

Putting Them to the Test

To determine how effectively each product destroys biological contaminants, 20- μ l samples of blood were added to varying quantities of 10% bleach solution and STERIPLEX SD; the samples were then allowed to remain exposed to the decontaminants

demonstrated numerous other benefits with regard to duration of effectiveness (two months), safety to personnel and equipment (non-corrosive and non-toxic), time savings, and ease of use. However, bleach has a lower initial cost and can be purchased virtually anywhere. Both could affect some laboratory analysis procedures: Bleach forms crystals that could cause interference if the solution is not thoroughly removed by secondary wiping, and STERIPLEX SD may have fluorescent properties that could cause interference if detected in pure form.

Volume (μ l) of decontaminant per 20 μ l of blood	Qty (ng/ μ l) of DNA remaining			Result
	Control (no decontaminant)	Bleach solution	STERIPLEX SD	
100	12.60	5.45	0.46	Bleach solution: 2-fold reduction STERIPLEX SD: 30-fold reduction
	13.50	7.42	0.81	
	15.70	7.30	0.35	
200	12.60	1.78	0.26	Bleach solution: 7-fold reduction STERIPLEX SD: 47-fold reduction
	13.50	6.63*	0.30	
	15.70	1.78	0.30	

*This result was not concordant with the other two results in the triplicate set.

for 5 minutes. Four volumes of each solution were tested: 20 μ l, 40 μ l, 100 μ l, and 200 μ l. All of the tests were performed in triplicate. At the end of the 5-minute exposure, the samples were assessed to determine how much DNA remained, indicating the decontamination effectiveness of each solution.

The Results

Not surprisingly, the biggest reductions in DNA were observed when the decontaminants were used at volumes of 100 μ l (a 5-to-1 ratio) and 200 μ l (a 10-to-1 ratio). Results for these two ratios are presented in the above table.

Conclusions

Overall, both products were effective at destroying DNA, but STERIPLEX SD was shown to be 7 to 15 times more effective. STERIPLEX SD also

About This Study

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www.nfstc.org/forensic-technology/technology-evaluations/biology-dna/

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