

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2024

DateRun: 02/23/2024

Experimenters: Aditi Patel, Jaimie Thibeault

ClientType: Lab

ProjectNumber: Project #12

Substrates: Stainless Steel

PartType: Coupon

Contaminants: MS2 Bacteriophage

Cleaning Methods: Pour Plate

Analytical Methods: Organism count

Purpose: To evaluate the efficacy of hydrogen peroxide cleaners with inactivating MS2 on a hard surface without agitation.

**Experimental Procedure:** Pour Plate Method - MS2 Bacteriophage

Six hours prior to the run, E.coli 15597 was subcultured into three milliliters of tryptic soy broth (TSB) screw-cap tubes and incubated at 37°C (98.6°F). 27 screw-cap tubes filled with 10ml of 0.5X tryptic soy agar (TSA) were autoclaved. The biosafety cabinet (BSC) was sprayed with 70% v/v isopropyl alcohol using a paper towel before spraying any items going into the BSC. Once autoclaving was complete, the TSA tubes were placed into a 45°C (113°F) D.I. water bath inside the biosafety cabinet (BSC). The four glass Petri dishes were marked using a black sharpie to designate the positive (P+), negative (N-), Test 1 (T1), and Test 2 (T2). Ten microliters of the organism were pipetted onto the P+, T1, and T2 stainless steel coupons and air-dried for 15 minutes. A motorized pipette with 10ml tips was used to pipet 15 ml of Dey-Engley (D/E) neutralizing broth into four separate 50ml conical tubes labeled P+, N-, T1, and T2. Once the MS2 bacteriophage dried on the coupons, the P+ coupon was placed into the conical tube. The N-, T1, and T2 were pipetted with 1000µl of the cleaning solution onto each coupon for 30 seconds before immediately placing them in the conical tube with an autoclaved forceps. The conical tubes were then placed on the shaker for 10 minutes. During this time, using the 1000ml pipette, 900ml of 1x phosphate-buffered saline (PBS) was pipetted into nine autoclaved dilution tubes, and serial dilutions were made for P+, T1, and T2 up to 10<sup>-4</sup> using 100µl of the shaken D/E broth. Once the six-hour sub-time was complete, the E. coli 15597 subculture was removed from the incubator for use. For each variable (N-, P+, T1, and T2), 100µl of the stock and serial dilutions of MS2 bacteriophage, and 100µl of the E.coli 15597 subculture were combined into an empty dilution tube. A screwcap tube of 0.5X TSA was removed from the water bath, wiped with a paper towel to remove moisture, and poured into the dilution tube. The mixture was immediately poured into a sterile polystyrene petri dish; swirled to cover the entire plate surface, and then air-dried before covering. Dried Petri dishes were placed into a clean labeled zip lock bag that was partially closed and incubated at 37°C overnight. Plates were counted the following day based on the clear lysis zones in the bacterial lawn of growth (1 plate forming unit) to calculate log reduction and percent removal.

Results:

Product	Log Reduction	Percent Reduction
Bona Power Plus Antibacterial Surface Cleaner	7.3500	100.0000
Bona Power Plus Hard-Surface Floor Cleaner	6.9275	100.0000
Earth Essentials Multi-purpose Disinfectant Cleaner	7.1400	100.0000
Homesolv by Citra Solv Multi-purpose disinfectant cleaner	7.3167	100.0000
Honest Disinfecting Spray (Without chlorine Bleach)	7.1833	100.0000
Kaboom (with the power of oxi-clean)	6.0943	99.9412
Libman Multisurface Disinfecting Cleaner	7.3133	100.0000
Lysol with Hydrogen Peroxide Multi-Purpose Cleaner	6.5900	100.0000
Oxivir 1 Disinfectant Cleaner	7.3675	89.7584
PERdiem® General Purpose Cleaner with Hydrogen Peroxide (Concentrate)	7.4233	100.0000

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PERdiem General Purpose Cleaner with Hydrogen Peroxide (1:64 Dilution - Spray Bottle)	0.3626	55.6196
Puracy Disinfecting Surface Cleaner	6.8900	100.0000

Summary:

<b>Substrates:</b>		Stainless Steel				
<b>Contaminants:</b>		MS2 Bacteriophage				
Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:	
Bona US	Power Plus Antibacterial Surface Cleaner	100%	100.00	<input checked="" type="checkbox"/>		
Bona US	Bona PowerPlus Antibacterial Hard-Surface Floor Cleaner	100%	100.00	<input checked="" type="checkbox"/>		
CVS Health	Earth Essentials by Total Home Multi-Purpose Disinfectant Cleaner	100%	100.00	<input checked="" type="checkbox"/>		
CitraSolv	HomeSolv by CitraSolv Multi-Purpose Disinfectant Cleaner	100%	100.00	<input checked="" type="checkbox"/>		
The Honest Company, Inc.	Honest Disinfecting Spray	100%	100.00	<input checked="" type="checkbox"/>		
Church & Dwight Co Inc.	Kaboom With the Power of OxiClean	100%	99.00	<input type="checkbox"/>		
The Libman Company	Libman Multi-Surface Disinfecting Cleaner	100%	100.00	<input checked="" type="checkbox"/>		
Reckitt Benckiser	Lysol with Hydrogen Peroxide Multi-Purpose Cleaner	100%	100.00	<input checked="" type="checkbox"/>		
Sealed Care - Diversey Care	Perdiem General Purpose Cleaner w/ Hydrogen Peroxide	100%	100.00	<input checked="" type="checkbox"/>		
Diversey Corporation	PERdiem General Purpose Cleaner with Hydrogen Peroxide - General Purpose Cleaners	1.5%	55.62	<input type="checkbox"/>		
Puracy	Puracy Disinfecting Surface Cleaner	100%	100.00	<input checked="" type="checkbox"/>		
Diversey Corporation	Oxivir 1 RTU Disinfectant Cleaner	100%	89.76	<input type="checkbox"/>		

Conclusion:

Bona Power Plus Antibacterial Surface cleaner, Bona power plus hard surface floor cleaner, earth essentials, Homesolv, Honest, Libman, Lysol, concentrated PERdiem, and Puracy had 100% MS2 reduction. Diluted PERdiem had a 55.6196% reduction, Oxivir had a 89.7574% reduction, and Kaboom had a 99.9412% reduction.