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Virus / COVID-19 & SARs Testing

11/31 Cherry Street, Ballina NSW 2478. BioInnovate Pty Ltd. ABN 79 642 654 126.

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Virus / COVID-19 / SARs Testing

Testing and Results – Against Murine Hepatitis Virus MHV-1. The Australian Therapeutic Drugs Administration (TGA) recognised surrogate for COVID-19 & SARs, therefore is approved for efficacy against COVID-19 & SARs.

Plant Extracts commissioned testing on ViroCLEAR for virucidal activity using an internationally recognised standard TMCV 006, ASTM 1053 carrier method. Sample were sent to Eurofins AMS Pty Ltd in Australia who are one of the world's largest testing microbiology laboratories.

The results show conclusive evidence that the ViroCLEAR has viricidal efficacy against MHV-1 after 15 seconds exposure with 90.0% kill, 99% kill after 30 seconds and 99.9% kill after 90 seconds.

Product	Kill Time	Pathogen	Log Reduction	
ViroCLEAR	15 seconds	COVID-19 Virus	1.73	90%
	30 seconds	COVID-19 Virus	2.56	99%
	60 seconds	COVID-19 Virus	2.90	99.9%
	90 seconds	COVID-19 Virus	3.00	99.9%
	2 minutes	COVID-19 Virus	3.56	99.99%

Eurofin AMS test results are attached to this document below.

CONDITIONS	
Virus Strain	Murine hepatitis virus (MHV1) ATCC/VR-261
Cell Substrate	A9 cells ATCC/CCL- 1.4
Test Concentration	Neat
Contact Time	15 seconds
Test Temperature	Room temperature
Test Condition	Dirty 5% FBS (Fetal Bovine Serum)
Neutraliser	3 cc Sephadex Gel in PBS (Phosphate Buffer Saline)

RESULTS: TABLE 1: MHV1 test/control results for 15 seconds contact

Virus Dilution	Number of Inoculated Wells	Virus Control	Cytotoxicity	Neutralisation	Test Sample
10^{-1}	4	$4^{+}/4$	C	C	C
10^{-2}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-3}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-4}	4	$4^{+}/4$	N/A	N/A	$4^{+}/4$
10^{-5}	4	$4^{+}/4$	N/A	N/A	$3^{+}/4$
10^{-6}	4	$4^{+}/4$	N/A	N/A	$1^{+}/4$
10^{-7}	4	$2^{+}/4$	N/A	N/A	N/A
10^{-8}	4	$1^{+}/4$	N/A	N/A	N/A
Log_{10}	-	**7.23**	**1.5**	**1.5**	**5.50**
Log_{10} Reduction of Virus after Treatment				**1.73**	

Note: Presence of virus in each response is recorded as **"+"**
Absence of virus in each response is recorded as "0"
Cytotoxic response is recorded as "C"
Calculated virus titre = $10^{7.23}TCID_{50/0.1ml}$ ($7.23\ log_{10}$)
Cell control - 4 wells with healthy cell monolayer

* The Reed & Muench LD50 Method was used for determining the virus titre endpoint.

CONCLUSIONS:

Considering the cytotoxicity and neutralisation test results, the sample has shown virucidal efficacy against MHV1 by achieving 1.73 log reduction in virus concentration after 15 seconds exposure period at room temperature.

CONDITIONS	
Virus Strain	Murine hepatitis virus (MHV1) ATCC/VR-261
Cell Substrate	A9 cells ATCC/CCL- 1.4
Test Concentration	Neat
Contact Time	30 seconds
Test Temperature	Room temperature
Test Condition	Dirty 5% FBS (Fetal Bovine Serum)
Neutraliser	3 cc Sephadex Gel in PBS (Phosphate Buffer Saline)

RESULTS: TABLE 1: MHV1 test/control results for 30 seconds contact

Virus Dilution	Number of Inoculated Wells	Virus Control	Cytotoxicity	Neutralisation	Test Sample
10^{-1}	4	$4^{+}/4$	C	C	C
10^{-2}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-3}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-4}	4	$4^{+}/4$	N/A	N/A	$4^{+}/4$
10^{-5}	4	$4^{+}/4$	N/A	N/A	$1^{+}/4$
10^{-6}	4	$4^{+}/4$	N/A	N/A	$0^{+}/4$
10^{-7}	4	$2^{+}/4$	N/A	N/A	N/A
10^{-8}	4	$1^{+}/4$	N/A	N/A	N/A
Log_{10}	-	**7.23**	**1.5**	**1.5**	**4.67**
Log_{10} Reduction of Virus after Treatment				**2.56**	

Note: Presence of virus in each response is recorded as **"+"**
Absence of virus in each response is recorded as "0"
Cytotoxic response is recorded as "C"
Calculated virus titre = $10^{7.23}TCID_{50/0.1ml}$ ($7.23\ log_{10}$)
Cell control - 4 wells with healthy cell monolayer

* The Reed & Muench LD50 Method was used for determining the virus titre endpoint.

CONCLUSIONS:

Considering the cytotoxicity and neutralisation test results, the sample has shown virucidal efficacy against MHV1 by achieving 2.56 log reduction in virus concentration after 30 seconds exposure period at room temperature.

CONDITIONS	
Virus Strain	Murine hepatitis virus (MHV1) ATCC/VR-261
Cell Substrate	A9 cells ATCC/CCL- 1.4
Test Concentration	Neat
Contact Time	60 seconds
Test Temperature	Room temperature
Test Condition	Dirty 5% FBS (Fetal Bovine Serum)
Neutraliser	3 cc Sephadex Gel in PBS (Phosphate Buffer Saline)

RESULTS: TABLE 1: MHV1 test/control results for 60 seconds contact

Virus Dilution	Number of Inoculated Wells	Virus Control	Cytotoxicity	Neutralisation	Test Sample
10^{-1}	4	$4^{+}/4$	C	C	C
10^{-2}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-3}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-4}	4	$4^{+}/4$	N/A	N/A	$3^{+}/4$
10^{-5}	4	$4^{+}/4$	N/A	N/A	$0^{+}/4$
10^{-6}	4	$4^{+}/4$	N/A	N/A	$0^{+}/4$
10^{-7}	4	$2^{+}/4$	N/A	N/A	N/A
10^{-8}	4	$1^{+}/4$	N/A	N/A	N/A
Log_{10}	-	**7.23**	**1.5**	**1.5**	**4.33**
Log_{10} Reduction of Virus after Treatment				**2.90**	

Note: Presence of virus in each response is recorded as **"+"**
Absence of virus in each response is recorded as "0"
Cytotoxic response is recorded as "C"
Calculated virus titre = $10^{7.23}TCID_{50/0.1ml}$ ($7.23\ log_{10}$)
Cell control - 4 wells with healthy cell monolayer

* The Reed & Muench LD50 Method was used for determining the virus titre endpoint.

CONCLUSIONS:

Considering the cytotoxicity and neutralisation test results, the sample has shown virucidal efficacy against MHV1 by achieving 2.90 log reduction in virus concentration after 60 seconds exposure period at room temperature.

CONDITIONS	
Virus Strain	Murine hepatitis virus (MHV1) ATCC/VR-261
Cell Substrate	A9 cells ATCC/CCL- 1.4
Test Concentration	Neat
Contact Time	90 seconds
Test Temperature	Room temperature
Test Condition	Dirty 5% FBS (Fetal Bovine Serum)
Neutraliser	3 cc Sephadex Gel in PBS (Phosphate Buffer Saline)

RESULTS: TABLE 1: MHV1 test/control results for 90 seconds contact

Virus Dilution	Number of Inoculated Wells	Virus Control	Cytotoxicity	Neutralisation	Test Sample
10^{-1}	4	$4^{+}/4$	C	C	C
10^{-2}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-3}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-4}	4	$4^{+}/4$	N/A	N/A	$3^{+}/4$
10^{-5}	4	$4^{+}/4$	N/A	N/A	$0^{+}/4$
10^{-6}	4	$3^{+}/4$	N/A	N/A	$0^{+}/4$
10^{-7}	4	$3^{+}/4$	N/A	N/A	N/A
10^{-8}	4	$1^{+}/4$	N/A	N/A	N/A
Log_{10}	-	**7.33**	**1.5**	**1.5**	**4.33**
Log_{10} Reduction of Virus after Treatment				**3.0**	

Note: Presence of virus in each response is recorded as **"+"**
Absence of virus in each response is recorded as "0"
Cytotoxic response is recorded as "C"
Calculated virus titre = $10^{7.33}TCID_{50/0.1ml}$ ($7.33\ log_{10}$)
Cell control - 4 wells with healthy cell monolayer

* The Reed & Muench LD50 Method was used for determining the virus titre endpoint.

CONCLUSIONS:

Considering the cytotoxicity and neutralisation test results, the sample has shown virucidal efficacy against MHV1 by achieving 3.00 log reduction in virus concentration after 90 seconds exposure period at room temperature.

CONDITIONS	
Virus Strain	Murine hepatitis virus (MHV1) ATCC/VR-261
Cell Substrate	A9 cells ATCC/CCL- 1.4
Test Concentration	Neat
Contact Time	2 minutes
Test Temperature	Room temperature
Test Condition	Dirty 5% FBS (Fetal Bovine Serum)
Neutraliser	3 cc Sephadex Gel in PBS (Phosphate Buffer Saline)

RESULTS: TABLE 1: MHV1 test/control results for 2 minutes contact

Virus Dilution	Number of Inoculated Wells	Virus Control	Cytotoxicity	Neutralisation	Test Sample
10^{-1}	4	$4^{+}/4$	C	C	C
10^{-2}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$4^{+}/4$
10^{-3}	4	$4^{+}/4$	$0^{+}/4$	$4^{+}/4$	$3^{+}/4$
10^{-4}	4	$4^{+}/4$	N/A	N/A	$2^{+}/4$
10^{-5}	4	$4^{+}/4$	N/A	N/A	$0^{+}/4$
10^{-6}	4	$3^{+}/4$	N/A	N/A	$0^{+}/4$
10^{-7}	4	$3^{+}/4$	N/A	N/A	N/A
10^{-8}	4	$1^{+}/4$	N/A	N/A	N/A
Log_{10}	-	**7.33**	**1.5**	**1.5**	**3.77**
Log_{10} Reduction of Virus after Treatment				**3.56**	

Note: Presence of virus in each response is recorded as **"+"**
Absence of virus in each response is recorded as "0"
Cytotoxic response is recorded as "C"
Calculated virus titre = $10^{7.33}TCID_{50/0.1ml}$ ($7.33\ log_{10}$)
Cell control - 4 wells with healthy cell monolayer

* The Reed & Muench LD50 Method was used for determining the virus titre endpoint.

CONCLUSIONS:

Considering the cytotoxicity and neutralisation test results, the sample has shown virucidal efficacy against MHV1 by achieving 3.56 log reduction in virus concentration after 2 minutes exposure period at room temperature.

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Rhinovirus Testing

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Rhinovirus Testing

Testing and Results – Against Rhinovirus (common cold)

Plant Extracts commissioned testing on ViroCLEAR for virucidal activity using an internationally recognised standard TMCV 006, ASTM 1053 carrier method. Sample were sent to Eurofins AMS Pty Ltd in Australia who are one of the world's largest testing microbiology laboratories.

The results show conclusive evidence that the ViroCLEAR has viricidal efficacy against Rhinovirus in 90 seconds.

Product	Kill Time	Pathogen	Log Reduction
ViroCLEAR	90 seconds	Rhinovirus	5.83 complete kill

Eurofin AMS test results are attached to this document below.

CONDITIONS	
Virus Strain	Human Rhinovirus 37 ATCC/VR-1607
Cell Substrate	MRC5 ATCC/CCL-171
Test Concentration	Neat
Contact Time	90 seconds
Test Temperature	Room temperature
Test Condition	Dirty 5% FBS (Fetal Bovine Serum)
Neutraliser	3 cc Sephadex Gel in PBS (Phosphate Buffer Saline)

RESULTS: TABLE 1: Human Rhinovirus 37 test/control results for 90 seconds contact

Virus Dilution	Number of Inoculated Wells	Virus Control	Percentage	Cytotoxicity	Neutralisation	Test Sample	Percentage
10^{-1}	4	$4^{+}/4$	100.00	C	C	C	N/A
10^{-2}	4	$4^{+}/4$	100.00	C	C	C	N/A
10^{-3}	4	$4^{+}/4$	100.00	$0^{+}/4$	$4^{+}/4$	$0^{+}/4$	0.00
10^{-4}	4	$4^{+}/4$	100.00	N/A	N/A	$0^{+}/4$	0.00
10^{-5}	4	$4^{+}/4$	100.00	N/A	N/A	$0^{+}/4$	0.00
10^{-6}	4	$4^{+}/4$	100.00	N/A	N/A	$0^{+}/4$	0.00
10^{-7}	4	$4^{+}/4$	100.00	N/A	N/A	N/A	N/A
10^{-8}	4	$3^{+}/4$	75.00	N/A	N/A	N/A	N/A
10^{-9}	4	$0^{+}/4$	0.00	N/A	N/A	N/A	N/A
Log_{10}	-	**8.33**	-	**2.50**	**2.50**	**2.50**	-
Log_{10} Reduction of Virus after Treatment					**5.83**		

Note: Presence of virus in each response is recorded as **"+"**
Absence of virus in each response is recorded as "0"
Cytotoxic response is recorded as "C"
Calculated virus titre = $10^{8.33}TCID_{50/0.1ml}$ (8.33 log_{10})
Cell control - 4 wells with healthy cell monolayer

* The Reed & Muench LD50 Method was used for determining the virus titre endpoint.

CONCLUSIONS:

Considering the cytotoxicity and neutralisation test results, the sample has shown virucidal efficacy against Human Rhinovirus 37 by achieving 5.83 log reduction in virus concentration after 90 seconds exposure period at room temperature.

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Candida Albicans Testing

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Candida Albicans Testing

Testing and Results – Against Candida Albicans (athletes' foot, Tinea, Thrush)

Plant Extracts commissioned testing on ViroCLEAR for yeast activity using an internationally recognised standard EN13624. Samples were sent to Eurofins AMS Pty Ltd in Australia who are one of the world's largest testing microbiology laboratories.

The results show conclusive evidence that the ViroCLEAR has yeast efficacy against Candida Albicans in 60 seconds in clean conditions.

Product	Kill Time	Pathogen	Log Reduction
ViroCLEAR	60 seconds	Candida Albicans	>5.11 log complete kill

Eurofin AMS test results are attached to this document below.

Test Conditions	
Test Concentration	Neat
Contact Time	60 Seconds
Neutraliser/ Dilution	T6 1:10
Test Conditions	Clean (0.03% BSA)
Test Temperature	Room Temperature

RESULTS

Table 1: Surviving organisms after exposure to the Product under Test

Organism	Inoculum Control Count	Surviving Test Organisms	
		60 Seconds	
	CFU/mL (Log_{10})	CFU/mL (Log_{10})	Log reduction
C.albicans ATCC 10231	1.28×10^6 (6.11)	<10 <(1.00)	>5.11

CFU = Colony Forming Unit

Table 2 Neutralisation Validation Results

Organisms	Validation suspension (Nv)	Experimental condition (A)	Neutralizer control (B)	Method validation (C)	Pass/Fail
C.albicans ATCC 10231	15	25	19	19	Pass

A, B & C must be ≥ 0.5Nv

COMMENTS: The product showed greater than 5 log reduction against *C.albicans* at 60 seconds contact time.

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Hospital Surface Carrier Test

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Hospital Surface Carrier Test

We commissioned testing for ViroCLEAR for Hospital Surface Carrier testing using an internationally recognised standards AOAC method 991.47, 991.48 & 991.49, TMD 253. Samples were sent to Eurofins AMS Pty Ltd in Australia who are one of the world's largest testing microbiology laboratories. The results are tabled below.

Organism	Carriers with growth	Total inoculated carriers	Acceptance Criteria
S.Aureus	0	60	2+/60 complete kill
Ps.Aeruginosa	0	60	3+/60 complete kill
S.Cholerasuis	0	60	2+/60 complete kill

Conclusion
ViroCLEAR had complete kill against all 60 tests for each pathogen.

ViroCLEAR can be classified as a Hospital Grade Disinfectant Spray.

Eurofins/AMS laboratories test results are attached to this document below.

Surface Carrier Test

Test Conditions	
Temperature	Room Temperature
Neutraliser	T6 (10mL)
Type of Carrier	Glass Penicylinders
Soil	5% Horse Serum
Contact Time	10 Minutes
Concentration	Neat

RESULTS:

ORGANISM	ATCC REF No.	SUB-CULTURE	CARRIERS WITH GROWTH	TOTAL INOCULATED CARRIERS	ACCEPTANCE CRITERIA*
Staphylococcus aureus	6538	3	0	60	2+/60
Pseudomonas aeruginosa	15442	3	0	60	3+/60
Salmonella choleraesuis	10708	3	0	60	2+/60

* Maximum allowable number of carriers showing growth out of total number inoculated.

FINAL RESULTS:

The sample when tested according to the conditions described herein, has met the requirements of AOAC 991.47, 991.48 and 991.49 when tested under the conditions specified above.

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Hospital Disinfectant Time Kill Test

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Hospital Disinfectant Time Kill Test

We commissioned testing for ViroCLEAR for Hospital Disinfectant Time kill test using an internationally recognised standard EN13727. Samples were sent to Eurofins AMS Pty Ltd in Australia who are one of the world's largest testing microbiology laboratories. The results are tabled below.

Product	Kill Time	Pathogen	Log Reduction
ViroCLEAR	30 seconds	S.Aureus	>6.37 complete kill
		E.Coli	>6.34 complete kill
		Ps.Aeruginosa	>6.62 complete kill
		E.Hirae	>6.19 complete kill
		Pr.Vulgaris	>6.52 complete kill
	60 seconds	S.Aureus	>6.37 complete kill
		E.Coli	>6.34 complete kill
		Ps.Aeruginosa	>6.62 complete kill
		E.Hirae	>6.19 complete kill
		Pr.Vulgaris	>6.52 complete kill
	120 seconds	S.Aureus	>6.37 complete kill
		E.Coli	>6.34 complete kill
		Ps.Aeruginosa	>6.62 complete kill
		E.Hirae	>6.19 complete kill
		Pr.Vulgaris	>6.52 complete kill

Conclusion

ViroCLEAR had complete kill within 30 seconds of contact with the pathogens.

ViroCLEAR can be classified as a Hospital Grade Disinfectant.

Eurofins/AMS laboratories test results are attached to this document below.

Test Conditions	
Test Concentration	Neat
Contact Time	30 seconds
Neutraliser/ Dilution	T6 1:10
Test Conditions	Dirty (0.3% BSA + 0.3% sheep Erythrocytes)
Test Temperature	Room Temperature

RESULTS

Table 1: Surviving organisms after exposure to the Product under Test

Organism	Inoculum Control Count	Surviving Test Organisms	
		30 seconds	
	CFU/mL (Log_{10})	**CFU/mL (Log_{10})**	**Log reduction**
S.aureus ATCC 6538	2.35×10^7 (7.37)	<10 <(1.00)	>6.37
E.coli ATCC 10536	2.20×10^7 (7.34)	<10 <(1.00)	>6.34
P.aeruginosa ATCC 15442	4.20×10^7 (7.62)	<10 <(1.00)	>6.62
E.hirae ATCC 10541	1.55×10^7 (7.19)	<10 <(1.00)	>6.19

CFU = Colony Forming Unit

Test Conditions	
Test Concentration	Neat
Contact Time	30 seconds
Neutraliser/ Dilution	T6 1:10
Test Conditions	Dirty (0.3% BSA + 0.3% Sheep Erythrocytes)
Test Temperature	Room Temperature

RESULTS

Table 1: Surviving organisms after exposure to the Product under Test			
Organism	**Inoculum Control Count**	**Surviving Test Organisms**	
		30 seconds	
	CFU/mL (Log_{10})	**CFU/mL (Log_{10})**	**Log reduction**
P.vulgaris	3.20×10^7 (7.51)	<10 (<1.00)	>6.51

CFU = Colony Forming Unit

Test Conditions	
Test Concentration	Neat
Contact Time	1 Minute
Neutraliser/ Dilution	T6 1:10
Test Conditions	Dirty (0.3% BSA + 0.3% Sheep Erythrocytes)
Test Temperature	Room Temperature

RESULTS

Table 1: Surviving organisms after exposure to the Product under Test

Organism	Inoculum Control Count	Surviving Test Organisms	
		1 Minute	
	CFU/mL (Log_{10})	CFU/mL (Log_{10})	Log reduction
P.vulgaris	3.20×10^7 (7.51)	<10 (<1.00)	>6.51

CFU = Colony Forming Unit

Test Conditions	
Test Concentration	Neat
Contact Time	2 Minutes
Neutraliser/ Dilution	T6 1:10
Test Conditions	Dirty (0.3% BSA + 0.3% Sheep Erythrocytes)
Test Temperature	Room Temperature

RESULTS

Table 1: Surviving organisms after exposure to the Product under Test			
Organism	**Inoculum Control Count**	**Surviving Test Organisms**	
		2 Minutes	
	CFU/mL (Log_{10})	**CFU/mL (Log_{10})**	**Log reduction**
P.vulgaris	3.20×10^7 (7.51)	<10 (<1.00)	>6.51

CFU = Colony Forming Unit

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Bacterial time kill testing comparing 80% based sanitiser and ViroCLEAR

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Hospital Disinfectant Time Kill Test – TGA/WHO recommended ethanol-based formula for hand sanitisers

We commissioned testing for the ethanol-based hand sanitiser formula recommended by the TGA/WHO using an internationally recognised standard EN13727.The formula was sent in 3 different forms to determine if ethanol is as effective as ViroCLEAR. The results are tabled below.

Product		Kill Time	Pathogen	Log Reduction
TGA-1 complete formula		30 seconds	S.Aureus	>6.69 complete kill
Ethanol	80%		E.Coli	>6.57 complete kill
Glycerin	1.45%		Ps.Aeruginosa	>6.48 complete kill
Hydrogen Peroxide	0.125%		E.Hirae	>6.63 complete kill
Water	18.425%			
TGA-2 less H^2O^2		30 seconds	S.Aureus	>6.69 complete kill
Ethanol	80%		E.Coli	>6.57 complete kill
Glycerin	1.45%		Ps.Aeruginosa	5.83
Water	18.55%		E.Hirae	5.70
TGA-3 less ethanol		30 seconds	S.Aureus	0.38
Glycerin	1.45%		E.Coli	0.00
Hydrogen Peroxide	0.125%		Ps.Aeruginosa	0.77
Water	98.425%		E.Hirae	0.00

Conclusion

ViroCLEAR had complete kill within 30 seconds of contact with the pathogens along with TGA-1. Neither TGA 2 nor 3 has complete kill within 30 seconds.

It can conclude that for ethanol to work as effectively as ViroCLEAR, hydrogen Peroxide needs to be present.

Eurofins/AMS laboratories test results are attached to this document below.

Test Conditions	
Test Concentration	Neat
Contact Time	30 Seconds
Neutraliser/ Dilution	T6 1:10
Test Conditions	Dirty (0.3% BSA + 0.3% Sheep Erythrocytes)
Test Temperature	Room Temperature

RESULTS

Table 1: Surviving organisms after exposure to the Product under Test

Organism	Inoculum Control Count	Surviving Test Organisms	
		30 Seconds	
	CFU/mL (Log_{10})	CFU/mL (Log_{10})	Log reduction
S.aureus ATCC 6538	4.85×10^7 (7.69)	2.06×10^7 (7.31)	0.38
E.coli ATCC 10536	3.75×10^7 (7.57)	4.65×10^7 (7.67)	0.00
P.aeruginosa ATCC 15442	3.00×10^7 (7.48)	5.10×10^6 (6.71)	0.77
E.hirae ATCC 10541	4.30×10^7 (7.63)	5.05×10^7 (7.70)	0.00

CFU = Colony Forming Unit

Table 2 Neutralisation Validation Results					
Organisms	**Validation suspension (Nv)**	**Experimental condition (A)**	**Neutralizer control (B)**	**Method validation (C)**	**Pass/Fail**
S.aureus ATCC 6538	16	10	13	13	Pass
E.coli ATCC 10536	37	26	24	32	Pass
P.aeruginosa ATCC 15442	38	35	34	36	Pass
E.hirae ATCC 10541	32	24	21	25	Pass

A, B & C must be ≥ 0.5Nv

COMMENTS: The product showed 0.00 log reduction against *E.coli* and *E.hirae,* 0.38 log reduction against *S.aureus,* and 0.77 log reduction against *P.aeruginosa* at 30 seconds contact time.

Test Conditions	
Test Concentration	Neat
Contact Time	30 Seconds
Neutraliser/ Dilution	T6 1:10
Test Conditions	Dirty (0.3% BSA + 0.3% Sheep Erythrocytes)
Test Temperature	Room Temperature

RESULTS

Table 1: Surviving organisms after exposure to the Product under Test

Organism	Inoculum Control Count	Surviving Test Organisms	
		30 Seconds	
	CFU/mL (Log_{10})	CFU/mL (Log_{10})	Log reduction
S.aureus ATCC 6538	4.85×10^7 (7.69)	<10 <(1.00)	>6.69
E.coli ATCC 10536	3.75×10^7 (7.57)	<10 <(1.00)	>6.57
P.aeruginosa ATCC 15442	3.00×10^7 (7.48)	4.50×10^1 (1.65)	5.83
E.hirae ATCC 10541	4.30×10^7 (7.63)	8.50×10^1 (1.93)	5.70

CFU = Colony Forming Unit

Table 2 Neutralisation Validation Results					
Organisms	**Validation suspension (Nv)**	**Experimental condition (A)**	**Neutralizer control (B)**	**Method validation (C)**	**Pass/Fail**
S.aureus ATCC 6538	16	10	13	17	Pass
E.coli ATCC 10536	37	26	24	33	Pass
P.aeruginosa ATCC 15442	38	35	34	31	Pass
E.hirae ATCC 10541	32	24	21	19	Pass

A, B & C must be ≥ 0.5Nv

COMMENTS: The product showed greater than 6 log reduction against *S.aureus, E.coli,* 5.83 log reduction against *P.aeruginosa,* and 5.70 log reduction against *E.hirae* at 30 seconds contact time.

Test Conditions	
Test Concentration	Neat
Contact Time	30 Seconds
Neutraliser/ Dilution	T6 1:10
Test Conditions	Dirty (0.3% BSA + 0.3% Sheep Erythrocytes)
Test Temperature	Room Temperature

RESULTS

Table 1: Surviving organisms after exposure to the Product under Test

Organism	Inoculum Control Count	Surviving Test Organisms	
		30 Seconds	
	CFU/mL (Log_{10})	CFU/mL (Log_{10})	Log reduction
S.aureus ATCC 6538	4.85×10^7 (7.69)	<10 <(1.00)	>6.69
E.coli ATCC 10536	3.75×10^7 (7.57)	<10 <(1.00)	>6.57
P.aeruginosa ATCC 15442	3.00×10^7 (7.48)	<10 <(1.00)	>6.48
E.hirae ATCC 10541	4.30×10^7 (7.63)	<10 <(1.00)	>6.63

CFU = Colony Forming Unit

Table 2 Neutralisation Validation Results					
Organisms	**Validation suspension (Nv)**	**Experimental condition (A)**	**Neutralizer control (B)**	**Method validation (C)**	**Pass/Fail**
S.aureus ATCC 6538	16	10	13	14	Pass
E.coli ATCC 10536	37	26	24	19	Pass
P.aeruginosa ATCC 15442	38	35	34	22	Pass
E.hirae ATCC 10541	32	24	21	23	Pass

A, B & C must be ≥ 0.5Nv

COMMENTS: The product showed greater than 6 log reduction against *S.aureus, E.coli, P.aeruginosa,* and *E.hirae* at 30 seconds contact time.

BioInnovate
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Bacterial time kill testing comparing 80% based sanitiser and ViroCLEAR

We commissioned testing on the ViroCLEAR against an ethanol-based sanitiser using an internationally recognised standard EN1276. Samples were sent to Symbio Laboratories Pty Ltd who are NATA registered. The results are tabled below.

Product	Kill Time	Pathogen	Log reduction
Ethanol 80%/water hand sanitiser	30 seconds	S.Aureus	0.13
		E.Coli	0.36
	60 seconds	S.Aureus	0.00
		E.Coli	0.24
	120 seconds	S.Aureus	0.07
		E.Coli	0.31
ViroCLEAR	30 seconds	S.Aureus	>5.67 complete kill
		E.Coli	>5.54 complete kill
	60 seconds	S.Aureus	>5.67 complete kill
		E.Coli	>5.54 complete kill
	120 seconds	S.Aureus	>5.67 complete kill
		E.Coli	>5.54 complete kill

Conclusion

The ViroCLEAR had complete kill within 30 seconds of contact with the pathogens. The ethanol 80%/water showed slight reductions in pathogens within 30 seconds which over the next 2 testing times showed no improvement.

It can be concluded that the ViroCLEAR is a far superior hand sanitiser.

Symbio laboratories test results are attached to this document below.

TIME KILL ANALYSIS

COMPANY: Plant Extract

LAB SAMPLE ID: S905834-B-2

SAMPLE DESCRIPTION: Benzalkonium Chloride Sanitiser

DATE RECEIVED: 14/05/2020

DATE TESTED: 22/05/2020

ANALYSIS DETAILS

TEST:	Time Kill Test
SYMBIO METHOD CODE:	SER140 for Time Kill Test
REFERENCE METHOD	EN1276
TEST CONDITION / CONTACT TIME:	Clean (1mL 0.3% BSA), 1 minute
RECOVERY MEDIA:	TSA
NEUTRALIZER / DILUTION:	T5, S.aureus 1/100, E.coli 1/10
INCUBATION TEMPERATURE / TIME:	37°C, 2 days

RESULTS

Test Organism	Inoculation Count CFU/g (Log 10)	Recovery Count CFU/g (Log 10)	Reduction Achieved Log 10
S. aureus ATCC 6538	37000000 (7.57)	<100 (<2)	>5.57
E coli ATCC 10536	22000000 (7.34)	<10 (<1)	>6.34

ASSESSMENT COMMENT

When tested in accordance with method EN1276, the product only achieved >5.57 log reduction against Staph aureus and >6.34 log reduction against E.coli at contact time of 1 minute with clean condition.

Note: 3 log= 99.9% killing, 4 log= 99.99% killing, 5 log= 99.999% killing, 6 log=99.9999% killing.

Authorised By

Name	Position
Suganthini Kanthan	Senior Microbiologist – Microbiology Laboratory Sydney

Head Office
44-52 (PO Box 4312) Brandl Street
Eight Mile Plains QLD 4113

admin@symbiolabs.com.au
www.symbiolabs.com.au
1300 703 166

Symbio Laboratories Pty Ltd
ABN 82 079 645 015
ACN 079 645 015

TIME KILL ANALYSIS

COMPANY: Plant Extract

LAB SAMPLE ID: S905834-B-1

SAMPLE DESCRIPTION: Benzalkonium Chloride Sanitiser

DATE RECEIVED: 14/05/2020

DATE TESTED: 22/05/2020

ANALYSIS DETAILS

TEST:	Time Kill Test
SYMBIO METHOD CODE:	SER140 for Time Kill Test
REFERENCE METHOD	EN1276
TEST CONDITION / CONTACT TIME:	Clean (1mL 0.3% BSA), 30 Second
RECOVERY MEDIA:	TSA
NEUTRALIZER / DILUTION:	T5, S.aureus 1/100, E.coli 1/10
INCUBATION TEMPERATURE / TIME:	37°C, 2 days

RESULTS

Test Organism	Inoculation Count CFU/g (Log 10)	Recovery Count CFU/g (Log 10)	Reduction Achieved Log 10
S. aureus ATCC 6538	37000000 (7.57)	<100 (<2)	>5.57
E coli ATCC 10536	22000000 (7.34)	<10 (<1)	>6.34

ASSESSMENT COMMENT

When tested in accordance with method EN1276, the product only achieved >5.57 log reduction against Staph aureus and >6.34 log reduction against E.coli at contact time of 30 Second with clean condition.

Note: 3 log= 99.9% killing, 4 log= 99.99% killing, 5 log= 99.999% killing, 6 log=99.9999% killing.

Authorised By

Name	Position
Suganthini Kanthan	Senior Microbiologist – Microbiology Laboratory Sydney

Head Office
44-52 (PO Box 4312) Brandl Street
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admin@symbiolabs.com.au
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1300 703 166

Symbio Laboratories Pty Ltd
ABN 82 079 645 015
ACN 079 645 015

TIME KILL ANALYSIS

COMPANY: Plant extract

LAB SAMPLE ID: S900212-A-1

SAMPLE DESCRIPTION: Immunity Defence Blend,

DATE RECEIVED: 27/04/2020

DATE TESTED: 30/04/2020

ANALYSIS DETAILS

TEST:	Time Kill Test
SYMBIO METHOD CODE:	SER140 for Time Kill Test
REFERENCE METHOD	EN1276
TEST CONDITION / CONTACT TIME:	Clean (1mL 0.3% BSA), 1 minute
RECOVERY MEDIA:	TSA
NEUTRALIZER / DILUTION:	T5, Validated 1/100
INCUBATION TEMPERATURE / TIME:	37°C, 2 days

RESULTS

Test Organism	Initial Count CFU/g (Log 10)	Recovery Count CFU/g (Log 10)	Reduction Achieved Log 10
S. aureus ATCC 6538	47000000 (7.67)	<100 (<2)	>5.67
E coli ATCC 10536	35000000 (7.54)	<100 (<2)	> 5.54

ASSESSMENT COMMENT

When tested in accordance with method EN1276, the product achieved >5.67 log reduction against Staph aureus and >5.54 log reduction against E.coli at contact time of 1 minute with clean condition.

Note: 3 log= 99.9% killing, 4 log= 99.99% killing, 5 log= 99.999% killing, 6 log=99.9999% killing.

Authorised By

Name	Position
Suganthini Kanthan	Senior Microbiologist – Microbiology Laboratory Sydney

Head Office
44-52 (PO Box 4312) Brandl Street
Eight Mile Plains QLD 4113

admin@symbiolabs.com.au
www.symbiolabs.com.au
1300 703 166

Symbio Laboratories Pty Ltd
ABN 82 079 645 015
ACN 079 645 015

TIME KILL ANALYSIS

COMPANY: Plant extract

LAB SAMPLE ID: S900212-C-1

SAMPLE DESCRIPTION: Immunity Defence Blend,

DATE RECEIVED: 27/04/2020

DATE TESTED: 30/04/2020

ANALYSIS DETAILS

TEST:	Time Kill Test
SYMBIO METHOD CODE:	SER140 for Time Kill Test
REFERENCE METHOD	EN1276
TEST CONDITION / CONTACT TIME:	Clean (1mL 0.3% BSA), 30 Second
RECOVERY MEDIA:	TSA
NEUTRALIZER / DILUTION:	T5, Validated 1/100
INCUBATION TEMPERATURE / TIME:	37°C, 2 days

RESULTS

Test Organism	Initial Count CFU/g (Log 10)	Recovery Count CFU/g (Log 10)	Reduction Achieved Log 10
S. aureus ATCC 6538	47000000 (7.67)	<100 (<2)	>5.67
E coli ATCC 10536	35000000 (7.54)	<100 (<2)	> 5.54

ASSESSMENT COMMENT

When tested in accordance with method EN1276, the product achieved >5.67 log reduction against Staph aureus and >5.54 log reduction against E.coli at contact time of 30 Second with clean condition.

Note: 3 log= 99.9% killing, 4 log= 99.99% killing, 5 log= 99.999% killing, 6 log=99.9999% killing.

Authorised By

Name	Position
Suganthini Kanthan	Senior Microbiologist – Microbiology Laboratory Sydney

Head Office
44-52 (PO Box 4312) Brandl Street
Eight Mile Plains QLD 4113

admin@symbiolabs.com.au
www.symbiolabs.com.au
1300 703 166

Symbio Laboratories Pty Ltd
ABN 82 079 645 015
ACN 079 645 015

TIME KILL ANALYSIS

COMPANY: Plant extract

LAB SAMPLE ID: S900212-A-2

SAMPLE DESCRIPTION: Ethanol 80% water

DATE RECEIVED: 27/04/2020

DATE TESTED: 30/04/2020

ANALYSIS DETAILS

TEST:	Time Kill Test
SYMBIO METHOD CODE:	SER140 for Time Kill Test
REFERENCE METHOD	EN1276
TEST CONDITION / CONTACT TIME:	Clean (1mL 0.3% BSA), 1 minute
RECOVERY MEDIA:	TSA
NEUTRALIZER / DILUTION:	T5, Validated 1/10
INCUBATION TEMPERATURE / TIME:	37°C, 2 days

RESULTS

Test Organism	Initial Count CFU/g (Log 10)	Recovery Count CFU/g (Log 10)	Reduction Achieved Log 10
S. aureus ATCC 6538	47000000 (7.67)	50000000 (7.70)	<0.00
E coli ATCC 10536	35000000 (7.54)	20000000 (7.30)	0.24

ASSESSMENT COMMENT

When tested in accordance with method EN1276, the product achieved <0.00 log reduction against Staph aureus and 0.24 log reduction against E.coli at contact time of 1 minute with clean condition.

Note: 3 log= 99.9% killing, 4 log= 99.99% killing, 5 log= 99.999% killing, 6 log=99.9999% killing.

Authorised By

Name	Position
Suganthini Kanthan	Senior Microbiologist – Microbiology Laboratory Sydney

Head Office
44-52 (PO Box 4312) Brandl Street
Eight Mile Plains QLD 4113

admin@symbiolabs.com.au
www.symbiolabs.com.au
1300 703 166

Symbio Laboratories Pty Ltd
ABN 82 079 645 015
ACN 079 645 015

TIME KILL ANALYSIS

COMPANY: Plant extract

LAB SAMPLE ID: S900212-C-2

SAMPLE DESCRIPTION: Ethanol 80% water

DATE RECEIVED: 27/04/2020

DATE TESTED: 30/04/2020

ANALYSIS DETAILS

TEST:	Time Kill Test
SYMBIO METHOD CODE:	SER140 for Time Kill Test
REFERENCE METHOD	EN1276
TEST CONDITION / CONTACT TIME:	Clean (1mL 0.3% BSA), 30 Second
RECOVERY MEDIA:	TSA
NEUTRALIZER / DILUTION:	T5, Validated 1/10
INCUBATION TEMPERATURE / TIME:	37°C, 2 days

RESULTS

Test Organism	Initial Count CFU/g (Log 10)	Recovery Count CFU/g (Log 10)	Reduction Achieved Log 10
S. aureus ATCC 6538	47000000 (7.67)	35000000 (7.54)	0.13
E coli ATCC 10536	35000000 (7.54)	15000000 (7.18)	0.36

ASSESSMENT COMMENT

When tested in accordance with method EN1276, the product achieved 0.13 log reduction against Staph aureus and 0.36 log reduction against E.coli at contact time of 30 Second with clean condition.

Note: 3 log= 99.9% killing, 4 log= 99.99% killing, 5 log= 99.999% killing, 6 log=99.9999% killing.

Authorised By

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Suganthini Kanthan	Senior Microbiologist – Microbiology Laboratory Sydney

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admin@symbiolabs.com.au
www.symbiolabs.com.au
1300 703 166

Symbio Laboratories Pty Ltd
ABN 82 079 645 015
ACN 079 645 015

TIME KILL ANALYSIS

COMPANY: Plant extract

LAB SAMPLE ID: S900212-B-2

SAMPLE DESCRIPTION: Ethanol 80% water

DATE RECEIVED: 27/04/2020

DATE TESTED: 30/04/2020

ANALYSIS DETAILS

TEST:	Time Kill Test
SYMBIO METHOD CODE:	SER140 for Time Kill Test
REFERENCE METHOD	EN1276
TEST CONDITION / CONTACT TIME:	Clean (1mL 0.3% BSA), 2 minute
RECOVERY MEDIA:	TSA
NEUTRALIZER / DILUTION:	T5, Validated 1/10
INCUBATION TEMPERATURE / TIME:	37°C, 2 days

RESULTS

Test Organism	Initial Count CFU/g (Log 10)	Recovery Count CFU/g (Log 10)	Reduction Achieved Log 10
S. aureus ATCC 6538	47000000 (7.67)	40000000 (7.6)	0.07
E coli ATCC 10536	35000000 (7.54)	17000000 (7.23)	0.31

ASSESSMENT COMMENT

When tested in accordance with method EN1276, the product achieved 0.07 log reduction against Staph aureus and 0.31 log reduction against E.coli at contact time of 2 minute with clean condition.

Note: 3 log= 99.9% killing, 4 log= 99.99% killing, 5 log= 99.999% killing, 6 log=99.9999% killing.

Authorised By

Name	Position
Suganthini Kanthan	Senior Microbiologist – Microbiology Laboratory Sydney

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