

**Summary of Test Data for
1.75% Iodine Disinfectant/Sanitizer
Premise Disinfectant**

Disinfectant Testing for Bacteria

Organism: *Staphylococcus aureus* ATCC No. 6538
Test Method: Use Dilution
Dilution: 1:213 (3 oz to 5 gal) 75 ppm iodine
Soil Load: 5% serum
Water: 400 ppm AOAC hard water
Temperature: 20°C
Exposure: 10 minutes
Results:

<u>Carriers exposed</u>	<u>Number of carriers showing growth</u>	
	<u>Primary</u>	<u>Secondary</u>
120	0	0

Phenol Resistance of Organism:

<u>Phenol Dilution</u>	Exposure time		
	<u>5 minutes</u>	<u>10 minutes</u>	<u>15 minutes</u>
1:60	+	-	-
1:70	+	+	+

Organism: *Salmonella choleraesuis* ATCC No. 10708
Test Method: Use Dilution
Dilution: 1:213 (3 oz to 5 gal) 75 ppm iodine
Soil Load: 5% serum
Water: 400 ppm AOAC hard water
Temperature: 20°C
Exposure: 10 minutes
Results:

<u>Carriers exposed</u>	<u>Number of carriers showing growth</u>	
	<u>Primary</u>	<u>Secondary</u>
120	0	0

Phenol Resistance of Organism:

<u>Phenol Dilution</u>	Exposure Time		
	<u>5 minutes</u>	<u>10 minutes</u>	<u>15 minutes</u>
1:90	+	-	-
1:100	+	+	-

Disinfectant Testing for Bacteria 1.75%, continued

Organism: *Pseudomonas aeruginosa* ATCC No. 15442
Test Method: Use Dilution
Dilution: 1:213 (3 oz to 5 gal) 75 ppm iodine
Soil Load: 5% serum
Water: 400 ppm AOAC hard water
Temperature: 20°C
Exposure: 10 minutes

<u>Carriers exposed</u>	<u>Number of carriers showing growth</u>	
	<u>Primary</u>	<u>Secondary</u>
240	0	0

Phenol Resistance of Organism:

<u>Phenol dilution</u>	<u>Exposure time</u>		
	<u>5 minutes</u>	<u>10 minutes</u>	<u>15 minutes</u>
1:80	+	+	-
1:90	+	+	+

Organism: *Escherichia coli* ATCC 8739
Test Method: Use Dilution
Dilution: 1:213 (3 oz to 5 gal) 75 ppm iodine
Soil Load: 5% serum
Water: 400 ppm AOAC hard water
Temperature: 20°C
Results:

<u>Carriers</u>	<u>Treated Number Showing Growth</u>
20	0

	<u>Neutralization Challenge Showing Growth</u>
20	20

Disinfectant Testing for Bacteria 1.75%, continued

Organism: *Escherichia coli*, 0157:H7 Strain (hemorrhagic)
Test Method: Modified Germicidal and Detergent Sanitizer Test
Dilution: 1:213 (3 ounces to 5 gallons)
Soil Load: 5% serum
Water: 400 ppm AOAC synthetic hard water
Temperature: 25°C
Exposure: 15, 30, 60 seconds
Results:

Percent Kill After

<u>15 seconds</u>	<u>30 seconds</u>	<u>60 seconds*</u>	<u>Results</u>
>99.9999%	>99.999%	>99.999%	Pass

*Calculated as percent reduction over numerical control

Sanitizer Testing for Bacteria

1.75%

Organism: *Staphylococcus aureus* ATCC No. 6538
Test Method: "Efficacy of Sanitizers Recommended for Inanimate Non-Food Contact Surfaces"
Dilution: 1:640 (1 oz to 5 gal) 25 ppm iodine
Water: 400 ppm AOAC hard water
Temperature: 5°C
Exposure Time 5 minutes
% Kill After Exposure >99.999

Organism: *Salmonella typhi* ATCC 6539
Test Method: "AOAC Available Chlorine Equivalent Concentration Test"
Dilution: 1:640 (1 oz to 5 gal) 25 ppm iodine
Water: 400 ppm AOAC hard water
Temperature: 20°C
Chlorine Equivalency >200 ppm

The Chlorine Equivalency test is a relative comparison of the test product to various concentration of chlorine.

Organism: *Listeria monocytogenes* ATCC 7644
Test Method: "Available Chlorine in Disinfectant: Germicidal Equivalent Concentration Test"
Dilution: 1:640 (1 oz to 5 gal) 25 ppm iodine
Water: Deionized
Temperature: 20°C

Control:

	<u>Dilution</u>	
NaOCl	200 ppm	5 of 10 lots with growth
	100 ppm	8 of 10 lots with growth
	50 ppm	8 of 10 lots with growth

Test Product:

1:640 ppm	0 of 10 lots with growth
1:640 ppm	0 of 10 lots with growth

The Chlorine Equivalency test is a relative comparison of the test product to various concentration of chlorine.

Disinfectant Testing for Viruses

1.75%

Organism: **Polio 1 virus**
Test Method: **Virucide Assay, EPA method**
Dilution: **1:213 (3 oz to 5 gal) 75 ppm iodine**
Water: **400 ppm AOAC hard water**
Temperature: **20°C**
Exposure: **10 minutes**
Soil Load: **5% serum**

Results: **No virus recovered with at least a 3 log decline.**
TCID₅₀ Virus Control $\geq 10^{-6.5}$ Change in Log ≥ 4.0
TCID₅₀ Virus Disinfectant $\leq 10^{-2.5}$ % inactivation >99.99

Organism: **Vaccinia virus**
Test Method: **Virucide Assay, EPA method**
Dilution: **1:213 (3 oz to 5 gal) 75 ppm iodine**
Water: **400 ppm AOAC hard water**
Temperature: **20°C**
Exposure: **10 minutes**
Soil Load: **5% serum**

Results: **No virus recovered with at least a 3 log decline.**
TCID₅₀ Virus Control $\geq 10^{-6.5}$ Change in Log ≥ 3.0
TCID₅₀ Virus Disinfectant $\leq 10^{-3.5}$ % inactivation >99.99

Organism: **Herpes Simplex Type 1 virus**
Test Method: **Virucide Assay, EPA method**
Dilution: **1:213 (3 oz to 5 gal) 75 ppm iodine**
Water: **400 ppm AOAC hard water**
Temperature: **20°C**
Exposure: **10 minutes**
Soil Load: **5% serum**

Results: **No virus recovered with at least a 3 log decline.**
TCID₅₀ Virus Control $\geq 10^{-6.5}$ Change in Log ≥ 3.0
TCID₅₀ Virus Disinfectant $\leq 10^{-3.5}$ % inactivation >99.99

Organism: HIV 1 (the virus associated with AIDS)
Test Method: EPA Carrier Method via Good Laboratory Practices
Dilution 1:213 (3 oz to 5 gal) 75 ppm iodine
Water: Tap water
Organic Soil: 10% Fetal Calf Serum
Cell Cultures: H-9

Cell method: Dilute in 10 fold increments in RPMI* medium (no other suitable diluent) containing 20% calf serum. Note: The serum serves as a non-specific "quencher" or "neutralizer" of cytotoxicity without itself being injurious to the host cells.

Administer the diluted disinfectant to host cell cultures at a ration of 1:10 at the frequency of 4 cultures per dilution.

Observe cultures daily for the above signs and calculate the TCID₅₀ by the Reed and Muench.

*Roswell Park Medical Institute

Test Method: The HIV 1 pool containing 10% serum prepared as per test methodology was dried on the surface of a glass petri dish. The test disinfectant was then applied following label directions.

Results:

Dilution of virus from surface into host	Virus disinfectant recovery from treated surface	Virus control titration from untreated slide	Tox control disinfectant w/o virus into host
10 ¹	1 2 3 4	1 2 3 4	1 2 3 4
10 ²	0 0 0 0	+ + + +	0 0 0 0
10 ³	0 0 0 0	+ + + +	0 0 0 0
10 ⁴	0 0 0 0	+ + + +	0 0 0 0
10 ⁵		+ + + +	
10 ⁶		0 0 0 0	
	TCID ₅₀ ≤ 10 ^{-1.0}	TCID ₅₀ = 10 ^{-5.5}	TCID ₅₀ ≤ 10 ^{-1.0}

Conclusion:

ID₅₀ Virus Control 10^{-5.5} Change in Log ≥ 4.5
 ID₅₀ Virus-disinfectant ≤ 10^{-1.0} Change in Log ≥ 99.9%

Product passes test.

Organism: Influenza A₂ J305
Test Method: Virucide Assay, EPA method
Dilution: 1:213 (3 oz to 5 gal) 75 ppm iodine
Water: 400 ppm AOAC hard water
Temperature: 20°C
Exposure: 10 minutes
Soil Load: 5% serum

Results: No virus recovered with at least a 3 log decline.
EID₅₀ Virus Control $\geq 10^{-6.5}$ Change in Log ≥ 5.5
EID₅₀ Virus Disinfectant $\leq 10^{-1}$ % inactivation >99.99

Organism: Canine Parvovirus
Test Method: Virucide Assay, EPA method
Dilution: 1:213 (3 oz to 5 gal) 75 ppm iodine
Water: 400 ppm AOAC hard water
Temperature: 20°C
Exposure: 120 minutes
Soil Load: 5% serum

Results: No virus recovered with at least a 3 log decline.
TCID₅₀ Virus Control = $10^{-5.0}$ Change in Log = 3.5
TCID₅₀ Virus Disinfectant = $10^{-1.5}$ % inactivation >99.99

Disinfectant Testing for Fungus
1.75%

Organism: *Trichophyton mentagrophytes*
Test Method: Pathogenic fungi, alternative test, DIS/TSS-6
Dilution: 1:213 (3 oz to 5 gal) 75 ppm iodine
Water: 400 ppm AOAC hard water
Temperature: 20°C
Exposure: 10 minutes
Soil Load: 5% serum

Results:

<u>Carriers exposed</u>	Number of carriers showing growth	
	<u>Primary</u>	<u>Secondary</u>
20	0	0

Phenol Resistance of Organism

<u>Phenol dilution</u>	Exposure time		
	<u>5 minutes</u>	<u>10 minutes</u>	<u>15 minutes</u>
1:60	+	+	-
1:70	+	+	-

UNIVERSITY OF MINNESOTA

Twin Cities Campus

*Veterinary Population Medicine
College of Veterinary Medicine*

*385 An Sci / Vet Med Bldg.
1988 Fitch Avenue
St. Paul, MN 55108
Office: 612-624-4719
Fax: 612-625-1210*

Jean Richard
VP and General manager
West Penetone Inc.
10900 Secant Street
Ville d'Anjou
Quebec
H1J 1S5

November 8, 2004

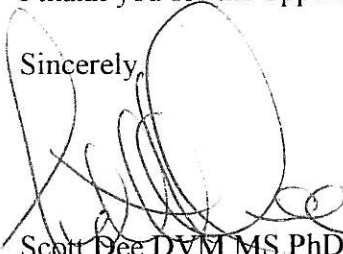
Dear Mr. Richard,

Enclosed find my final report regarding the trial I conducted at the University of Minnesota Swine Disease Eradication Center research farm on the efficacy of Premise Disinfectant against PRRSV-contaminated surfaces and transport vehicles.

In my opinion, when used properly, Premise Disinfectant is a highly efficacious disinfectant against PRRSV-contaminated surfaces and trailers. I encountered no negative effects of the product during handling or following exposure to the skin. I would highly support its use to disinfect PRRSV-contaminated fomites and premises found on swine farms. To insure the proper effect, it is important (as in all cases of disinfectant use) that users pay close attention to concentration, temperature and contact time.

I thank you for the opportunity to work with your company.

Sincerely,



Scott Dee DVM MS PhD Dipl; ACVM
Associate Professor

PRRSV: Premise Disinfectant summary

Objective 1: Surface testing

The goal of this experiment was to compare the efficacy of 2 different concentrations of Premise Disinfectant against PRRSV across a variety of farm-related surfaces and temperatures.

Variables

Surfaces: pieces of wood, plastic, concrete and metal

Temperatures: -20⁰C, 10⁰C, 20⁰C and 30⁰C

Concentrations: 75 ppm and 150 ppm

Procedure

1. Various surfaces were inoculated with 5×10^5 TCID₅₀ PRRSV isolate MN-30100
2. Surfaces were stored at designated temperatures.
3. Premise Disinfectant was applied using low pressure foamer.¹
4. Swabs were collected at 0, 30, 60, and 120 minutes post-treatment.
5. Swabs were frozen at -20⁰ C immediately post-collection.
6. Swabs were tested for the presence of PRRSV RNA by PCR.

¹: At -20⁰C, all disinfectants were diluted in 40% methanol instead of water to control freezing. Dilution rates remained the same.

Controls

Synergize control (1:128 dilution)

Virus control (stock virus, no disinfectant applied)

Negative control (virus-free cell culture fluid)

Conclusions

Effect of temperature: Premise Disinfectant performed best between at -20⁰C to 20⁰C.

Effect of concentration: The efficacy of the product against PRRSV is enhanced at the higher (150 ppm) concentration versus the lower concentration (75 ppm).

Effect of surface: Premise Disinfectant was effective across all surfaces between -20⁰C to 20⁰C.

Effect of time: Premise Disinfectant was most effective following a minimum contact period of 120 minutes.

Summary: At a 150 ppm concentration and with a 120 minute contact time, the efficacy of Premise Disinfectant was equal to that of Synergize at temperatures ranging from -20⁰ C to 20⁰ C across all surfaces.

Objective 2: Trailer testing

The purpose of this experiment was to assess the efficacy of 2 different concentrations of Premise Disinfectant in PRRSV-contaminated scale model trailers.

Variables

Time: 0, 30, 60 and 120 minutes post-inoculation

Temperature: 10⁰C and 20⁰C

Concentration: 75 ppm and 150 ppm

Procedure

1. Trailer models were inoculated with 5×10^5 TCID₅₀ PRRSV isolate MN-30100
2. Trailers were housed at 10⁰C or 20⁰C.
3. Trailers were washed using cold (20⁰C) water for 72 seconds
4. Premise Disinfectant was applied using low pressure foamer.
5. Swabs were collected at 0, 30, 60 and 120 minutes post-treatment.
6. Swabs were frozen at -20⁰ C immediately post-collection.
7. Swabs were tested for the presence of PRRSV RNA by PCR.
8. A total of 10 replicates were conducted.

Controls

Synergize control (1:128 dilution)

Virus control (stock virus, no disinfectant applied)

Negative control (virus-free cell culture fluid)

Drying control (PRRSV-positive trailers allowed to dry for 8 hours)

Summary

At a 150 ppm concentration and with a 120 minute contact time, the efficacy of Premise Disinfectant against PRRSV in model trailers was equal to that of Synergize when trailers were housed at 10⁰C.

At a 150 ppm concentration and with a 60 minute contact time, the efficacy of Premise Disinfectant against PRRSV in model trailers was equal to that of Synergize when trailers were housed at 20⁰C.

PREMISE DISINFECTANT RAW DATA

OBJECTIVE 1: SURFACE TRIALS

30 ° C

<u>WOOD</u>	<u>0 MIN</u>	<u>30 MIN</u>	<u>60 MIN</u>	<u>120 MIN</u>
150 ppm	POS	POS	POS	POS
75 ppm	POS	POS	POS	POS
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

PLASTIC

150 ppm	POS	POS	POS	POS
75 ppm	POS	POS	POS	POS
synergize	POS	POS	POS	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

CONCRT

150 ppm	POS	NEG	NEG	NEG
75 ppm	POS	NEG	NEG	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

METAL

150 ppm	POS	POS	POS	POS
75 ppm	POS	POS	POS	POS
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

10 ° C

<u>WOOD</u>	<u>0 MIN</u>	<u>30 MIN</u>	<u>60 MIN</u>	<u>120 MIN</u>
150 ppm	POS	POS	NEG	NEG
75 ppm	POS	POS	POS	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

PLASTIC

150 ppm	POS	POS	POS	NEG
75 ppm	POS	POS	POS	POS
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

CONCRT

150 ppm	POS	POS	NEG	NEG
75 ppm	POS	POS	POS	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

METAL

150 ppm	POS	POS	POS	NEG
75 ppm	POS	POS	POS	POS
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

OBJECTIVE 2: TRAILER TRIALS

10 ° C

<u>TRAILER</u>	<u>0 MIN</u>	<u>30 MIN</u>	<u>60 MIN</u>	<u>120 MIN</u>	<u>8 HR</u>
150 ppm	10/10 pos	10/10 pos	4/10 pos	0/10 pos	NT
75 ppm	10/10 pos	10/10 pos	8/10 pos	0/10 pos	NT
synergize	10/10 pos	6/10 pos	0/10 pos	0/10 pos	NT
dry	10/10 pos	NT	NT	0/10 pos	0/10 pos
virus ctrl	10/10 pos	10/10 pos	10/10 pos	10/10 pos	NT
neg ctrl	0/10 pos	0/10 pos	0/10 pos	0/10 pos	NT

20 ° C

<u>TRAILER</u>	<u>0 MIN</u>	<u>30 MIN</u>	<u>60 MIN</u>	<u>120 MIN</u>	<u>8 HR</u>
150 ppm	10/10 pos	6/10 pos	0/10 pos	0/10 pos	NT
75 ppm	10/10 pos	8/10 pos	5/10 pos	2/10 pos	NT
synergize	10/10 pos	3/10 pos	0/10 pos	0/10 pos	NT
dry	10/10 pos	NT	NT	0/10 pos	0/10 pos
virus ctrl	10/10 pos	10/10 pos	10/10 pos	10/10 pos	NT
neg ctrl	0/10 pos	0/10 pos	0/10 pos	0/10 pos	NT

20 ° C

<u>WOOD</u>	<u>0 MIN</u>	<u>30 MIN</u>	<u>60 MIN</u>	<u>120 MIN</u>
150 ppm	POS	NEG	NEG	NEG
75 ppm	POS	NEG	NEG	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

PLASTIC

150 ppm	POS	NEG	NEG	NEG
75 ppm	POS	NEG	NEG	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

CONCRT

150 ppm	POS	NEG	NEG	NEG
75 ppm	POS	POS	POS	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

METAL

150 ppm	POS	NEG	NEG	NEG
75 ppm	POS	NEG	NEG	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

-20 ° C

<u>WOOD</u>	<u>0 MIN</u>	<u>30 MIN</u>	<u>60 MIN</u>	<u>120 MIN</u>
150 ppm	POS	NEG	NEG	NEG
75 ppm	POS	NEG	NEG	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

PLASTIC

150 ppm	POS	NEG	NEG	NEG
75 ppm	POS	POS	POS	POS
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

CONCRT

150 ppm	POS	NEG	NEG	NEG
75 ppm	POS	POS	POS	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG

METAL

150 ppm	POS	POS	POS	NEG
75 ppm	POS	POS	POS	NEG
synergize	POS	NEG	NEG	NEG
virus ctrl	POS	POS	POS	POS
neg ctrl	NEG	NEG	NEG	NEG