MICROBIOLOGY DEPARTMENT 7218

U verw/Your ref: S070

Ons verw/Our ref: 17/37

Health and Hygiene
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Datum/Date: 2004-12-30

7218/ 1733791/ 04-2747/ X 3 4736/ 40

Microbiological Analysis – F10 Disinfectant Aerosol

1. SAMPLES RECEIVED

Five 500ml Aerosol Canisters (containing a 1% concentrate of F10 Super Concentrate Disinfectant and 80% alcohol solution with a dimethyl ether propellant) were submitted for microbiological analysis to determine the anti-bacterial efficacy. Tests were carried out on 09 September 2004, 20 September 2004 and 21 September2004.

2. TEST REQUESTED

Test the efficacy of the F10 Aerosol within a $27m^3$ stainless steel test chamber, a microorganism (*Staphylococcus epidermidis*) being introduced by "nebulizing" the organisms suspension in the atmosphere and then releasing the aerosol to disinfect. With air samples taken before and after treatment.

3. METHOD OF TEST

3.1 Settle plates

To determine the level of microbial contamination in the test facility for 10 minute and 30 minute contact times using standard plate count agar.

Initial samples were taken before spraying with the microorganism suspension, using five settle plates, one in each corner and one in the center of the test chamber for a 30 minute contact period.
The sampling was repeated after "nebulizing" the suspension of *Staphylococcus epidermidis*, 10^5 cfu/ml, into the test chamber.
The F10 Disinfectant Aerosol was then released in the test chamber (5 minute evacuation) and then allowing a 10 minute and 30 minute contact period before sampling with the standard plate count settle plates. The inlet ventilation port was kept closed for the full duration of the test.

3.2 SAS air sampling

The SAS Air sampler was also used to draw samples of the contaminated (spiked) atmosphere as well as the sampling after releasing the aerosol.

This test was performed by Testing and Conformity Services (Pty) Ltd, an affiliate of the SABS.
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(Refer also to the complete conditions printed on the back of the official test reports.)

4. Test Chamber and equipment photographs.

4.1 COLLISON NEBULISER

The micro-organism suspension containing 10^5 cfu/ml *Staphylococcus epidermidis* per ml was sprayed into the test laboratory atmosphere with the Collison Nebulizer using nitrogen gas as the propellant. (Settle plates)

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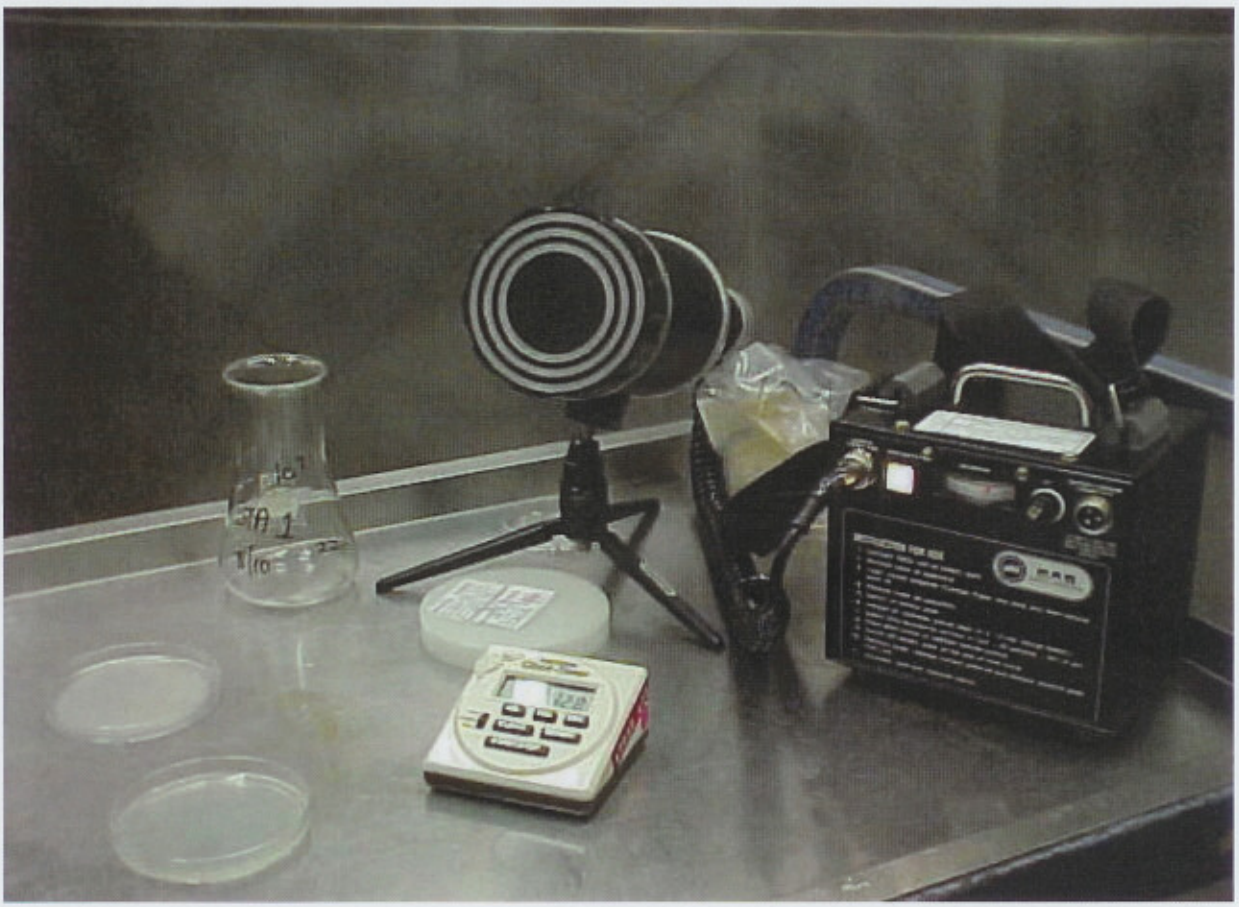
4.2 SAS Air Sampler

The ambient air was sampled after introduction of the micro-organism suspension and again after release of the F10 aerosol spray with the SAS Air Sampler at a rate of 360 litres for 2 minutes. Viable micro-organisms were recovered on the surface of Rodac plates (nutient agar) used in the sampler.



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4.3 The aerosol exposure chamber.

A stainless steel chamber 3m x 3m x 3m having a central drain plug toward which the floor slopes adequately. In the operating wall a door 0,75m x 1,5m and an observation window 700mm x 300mm. The chamber temperature was maintained at 25°C ± 1°C and a relative humidity of 60 ± 5%. The aerosol was expelled completely within 5 minutes of being released.

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5. RESULTS

5.1 Settle Plates – 30 minute (2004-09-09)
Initial bacterial control Counts – Control

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-09	Room	
1	Left side front	14
2	Left side back	30
3	Center	10
4	Right side front	15
5	Right side back	8
Average		15

After spraying with the *Staphylococcus epidermidis* (10^5 cfu/ml organism suspension)

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-09	Room	
1	Left side front	50
2	Left side back	90
3	Center	60
4	Right side front	50
5	Right side back	40
Average		58

After Aerosol Treatment – 30 min treatment & contact

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-09	Room	
1	Left side front	0
2	Left side back	0
3	Center	0
4	Right side front	0
5	Right side back	0
Average		0

Antibacterial activity : 100% reduction

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5.2 Settle Plates – 30 minute (2004-09-20)

Initial bacterial control Counts – Control

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-20	Room	
1	Left side front	4
2	Left side back	13
3	Center	1
4	Right side front	5
5	Right side back	20
Average		9

After spraying with the *Staphylococcus epidermidis* (10^5 cfu/ml organism suspension)

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-20	Room	
1	Left side front	195
2	Left side back	130
3	Center	244
4	Right side front	380
5	Right side back	223
Average		234

After Aerosol Treatment – 30 min treatment & contact

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-20	Room	
1	Left side front	0
2	Left side back	0
3	Center	0
4	Right side front	0
5	Right side back	0
Average		0

Antibacterial activity : 100% reduction

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5.3 Settle plates – 10 minute (2004-09-21)

Initial bacterial control Counts – Control

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-21	Room	
1	Left side front	40
2	Left side back	30
3	Center	1
4	Right side front	30
5	Right side back	20
Average		24

After spraying with the *Staphylococcus epidermidis* (10^5 cfu/ml organism suspension)

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-21	Room	
1	Left side front	220
2	Left side back	150
3	Center	210
4	Right side front	190
5	Right side back	320
Average		218

After Aerosol Treatment – 10 min treatment & contact

Plate number	Description of placement of plates	Total Micro-organism count
2004-09-21	Room	
1	Left side front	0
2	Left side back	0
3	Center	0
4	Right side front	0
5	Right side back	0
Average		0

Antibacterial activity: 100% reduction

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5.4 SAS Air Sample

5.4.1 Sampled 2004-09-09

Sample No	Description of sample	Total viable organisms / 360 l
1	Initial test – ambient baseline	48
2	Test After Control organism spray	160
3	After F10 Spray (Aerosol) – 10 minutes	0
4	After F10 Spray (Aerosol) – 15 minutes	0
5	After F10 Spray (Aerosol) – 20 minutes	0

5.4.2 Sampled 2004-09-20

Sample No	Description of sample	Total viable organisms / 360 l
1	Initial test – ambient baseline	24
2	Test After Control organism spray	114
3	After F10 Spray (Aerosol) – 10 minutes	0
4	After F10 Spray (Aerosol) – 15 minutes	0
5	After F10 Spray (Aerosol) – 20 minutes	0

6. Droplet Size Analysis of Aerosol sample F10SC 9 [Ref PVM 160(1)] 9Carbotec)

6.1 Table of Results

Size Band	Test 1	Test2	Test 3	Mean
0-30	24.0	24.4	24.8	24.4
30-50	35.3	34.2	36.4	35.3
50-70	26.7	26.1	26.4	26.4
70-100	12.9	13.8	11.6	12.7
>100	1.1	1.5	0.8	1.1
Median	44.7	44.9	43.8	**44.5**
Distribution Peak	41.1	40.7	40.5	40.7
I.Q. Range	29.6	30.8	28.7	29.7

Median = 44.5 am

6.2 Test Conditions

6.2.1 Sample temperature: 25°C
6.2.2 Lens Focal Length: 300mm
6.2.3 Spraying Distance from Laser Beam: 500 mm
6.2.4 Distribution Model used: Rosin Rammler
6.2.5 KD Value: 1 (data eliminated – refraction by propellant vapour)
VMD is the volume Median Diameter i.e. where half (by volume) the droplets are larger and half smaller.
I.Q. Range is the Inter-quartile range including 50% (by volume) of the droplets, with 25% above and 25% below this range. It is a measure of the droplet size distribution.

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7. Conclusions:

a) The test results demonstrate the bactericidal efficacy of F10 Super Concentrate Aerosol Can Spray with a 100% reduction of microorganisms after the two contact times of 10 minute and 30 minutes.
b) Settle plate microorganism's isolates commonly present in the ambient air – Staphylococci, bacterial spores and fungal spores.
c) The average reduction of the micro-organisms (*Staphylococcus epidermidis*) using 10 minute and 30 minute contact times was 100 %.
d) The F10 Super Concentrate Aerosol Can Spray is highly effective in reducing micro-organism from the air and on surfaces.

8. Addendum:

Analysis Report: ARC – Droplet Size of the disinfectant aerosol .

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ANALYSIS REPORT: ARC - INSTITUTE FOR SOIL, CLIMATE AND WATER
ONTLEDINGSVERSLAG: LNR - INSTITUUT VIR GROND KLIMAAT EN WATER

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Report Number: F 2004/05-0940

Report on: Droplet Size Analysis of aerosol sample F105C (Ref.PVM160(1)) (Carbotec)

Size Band (	Test 1	Test 2	Test 3	Mean
0-30	24.0	24.4	24.8	24.4
30-50	35.3	34.2	36.4	35.3
50-70	26.7	26.1	26.4	26.4
70-100	12.9	13.8	11.6	12.7
>100	1.1	1.5	0.8	1.1
Median(VMD)	44.7	44.9	43.8	44.5
Distr.Peak	41.1	40.7	40.5	40.7
I.Q. Range	29.6	30.8	28.7	29.7

TEST CONDITIONS

1. Sample Temperature: 25 C.
2. Lens Focal Length: 300mm
3. Spraying Distance from Laser Beam: 500 mm
4. Distribution Model used: Rosin Rammler
5. KD Value: 1 (data eliminated - refraction by propellant vapour).

VMD is the Volume Median Diameter ie where half (by vol) the droplets are larger and half smaller.

I.Q. Range is the Inter-quartile range ie the range including 50% (by volume) of the droplets, with 25% above and 25% below this range. It is a measure of the width of the droplet size distribution.