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OHS & Environmental Care
Sustainability
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Air Purification Technology Field Trial:

San-Air Bio-Clean Gel and Surface Sanitiser

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1. INTRODUCTION

CETEC were engaged to conduct air quality and surface swab testing as part of a field efficacy trial of San Air' s *Bio-Clean Gel* product. The product consists of the controlled release (evaporation) of an anti-fungal / anti-microbial agent into the air conditioning air-stream and the occupied zone.

The testing was conducted on stationary, unoccupied sleeper train carriages suspected to have prior indoor mould contamination.

The objectives of this testing were;

1. To quantify the reduction in indoor **airborne mould** over a three-week *Bio-Clean Gel* product use period.

2. To quantify the reduction in **surface mould and bacteria** following surface cleaning with *Surface Sanitiser* and followed by a three-week period of *Bio-Clean Gel* product use.

3. To quantify the reduction in **surface mould and bacteria** over a two-week period of *Bio-Clean Gel* product use only (no surface cleaning).

Study design was developed to assess San Air product claims based on previous laboratory trials; "*Kills bacteria and mould, removes odours. Prevents mould from growing in your indoor space.*"

The train carriages were chosen for to reduce external variables as they were a contained, air-conditioned indoor environment that could be tested with interruption or influence from occupants. Minor visible mould could be seen on the walls and a musty odour was noticed by the testing team at the commencement of the trial.

2. METHODOLOGY

2.1 TESTING DATES

Week 1 27/11/2020	**Week 2** 4/12/2020	**Week 3** 11/12/2020	**Week 4** 18/12/2020
Pre-Testing Baseline (no SanAir)	Testing (with SanAir)	Testing (with SanAir)	Testing (with SanAir)
Air: 3 locations (car 2377) + outdoor	Air: 3 locations (car 2377) + outdoor	Air: 3 locations (car 2377) + outdoor	Air: 3 locations (car 2377) + outdoor
Surface: 3 locations (car 2377)	Surface: 3 locations (car 2377)	Surface: 3 locations (car 2377)	Surface: 3 locations (car 2377)
	Pre-Testing Baseline (no SanAir)		Testing (with SanAir)
	Surface: 1 location (car 2374) No surface cleaning, high dust on internal duct surface.		Surface: 1 location (car 2374) No surface cleaning, high dust on internal duct surface.

2.1 SAMPLING AND ANALYSIS

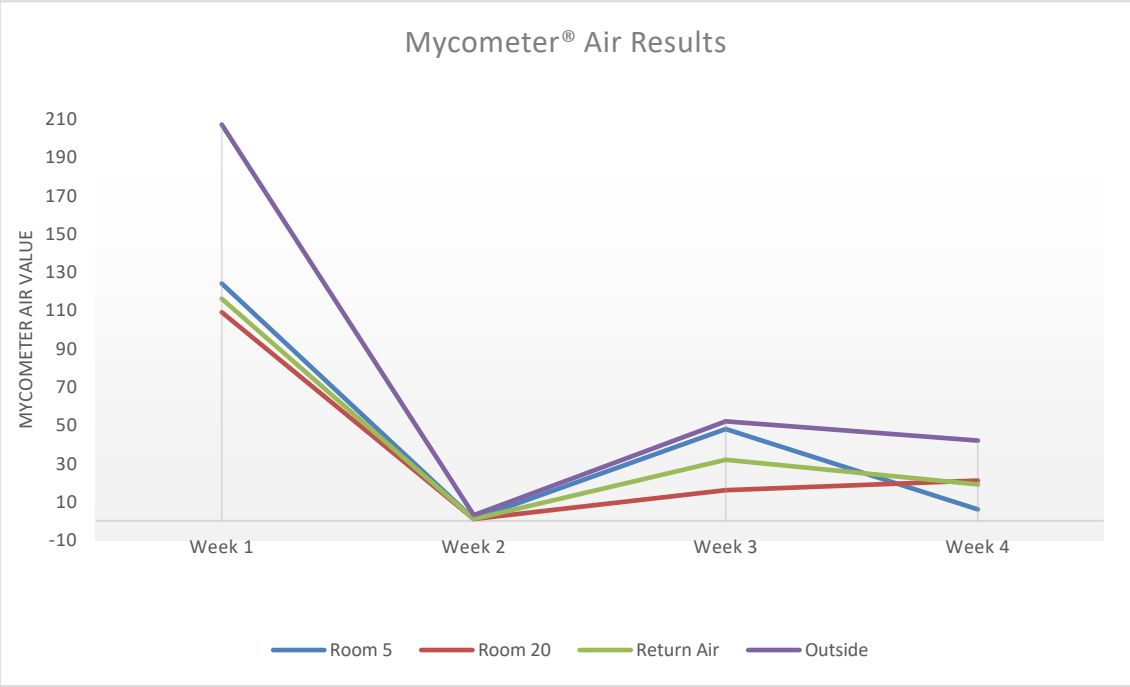
Parameter	Instrumentation / Lab Method	Density and location of measurements	Duration of measurement	Reporting	Target / Objective	Relevant IEQ Best Practice Limit
Mould in Air (viable, non-viable and non-culturable)	Mycometer-Air	2 locations per carriage in occupied spaces 1 in HVAC return air duct 1 outdoor reference	480L of air sampled over 2hr period	TWA concentration reported in MAV	Airborne mould should be maintained or reduced if SanAir air treatment objectives are achieved	Category A (Mycometer-Reference Level)
Mould on Surface (viable, non-viable and non-culturable)	Mycometer-Surface	2 locations per carriage on wall of occupied spaces 1 swab HVAC coil 1 swab reference carriage	9cm^2 template area swabbed	TWA concentration reported in MSV	Surface mould should be maintained or reduced if SanAir treatment objectives are achieved	Category A (Mycometer-Reference Level)
Bacteria on Surface (viable, non-viable and non-culturable)	Bactiquant-Surface	2 locations per carriage on wall of occupied spaces 1 swab HVAC coil 1 swab reference carriage	9cm^2 template area swabbed	TWA concentration reported in BSV	Surface bacteria should be maintained or reduced if SanAir treatment objectives are achieved	Category A (Bactiquant-Reference Level)

3. RESULTS

3.1 AIRBORNE MOULD

Mycometer Air Value MAV

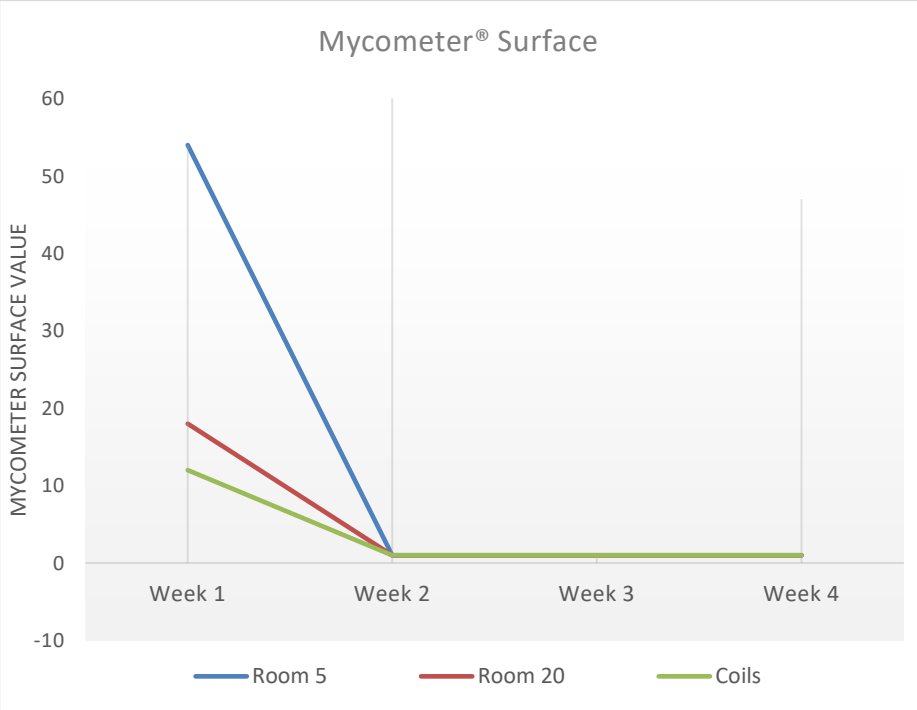
Car	Location	Week 1	Week 2	Week 3	Week 4	Average Weeks 2-4	Ave Reduction	Ave Red %	Adjusted for outside
2377	Room 5	124	1	48	6	18.3	105.7	**85**	-1
2377	Room 20	109	1	16	21	12.7	96.3	**88**	-4
2377	Return Air Duct	116	1	32	19	17.3	98.7	**85**	-1
	Outside	207	3	52	42	32.3	174.7	**84**	

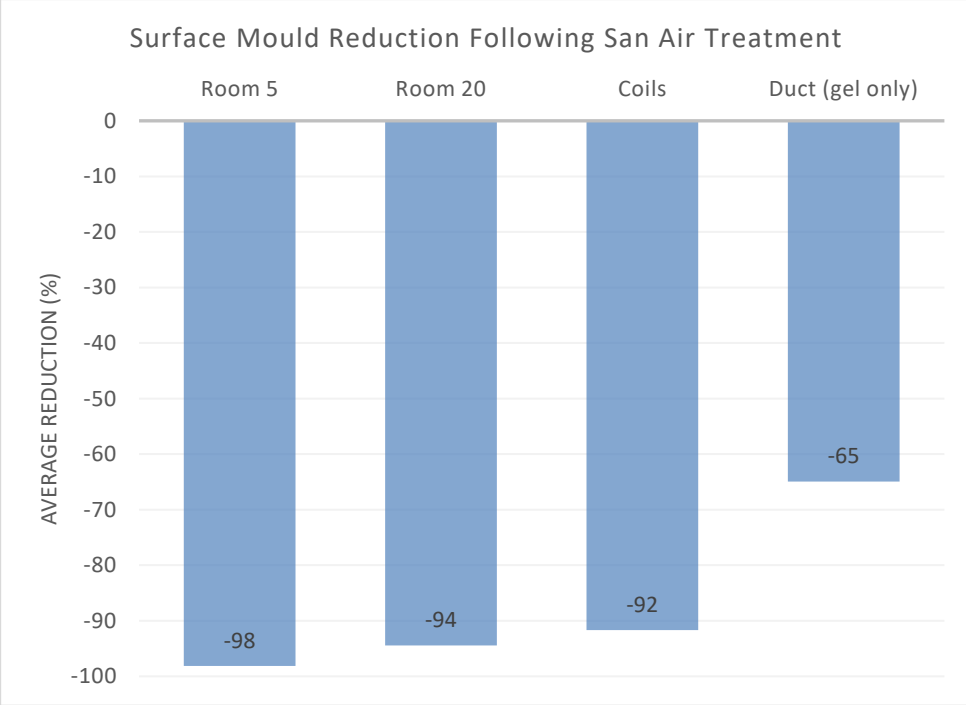


3.2 SURFACE MOULD

Mycometer Surface Value MSV

Car	Location	Week 1	Week 2	Week 3	Week 4	Average Weeks 2-4	Ave Reduction	Ave Reduction %
2377	Room 5	54	1	1	1	1.0	53.0	**98**
2377	Room 20	18	1	1	1	1.0	17.0	**94**
2377	Return Air Coil	12	1	1	1	1.0	11.0	**92**
2374	Duct (gel only)		134		47	47.0	87.0	**65**

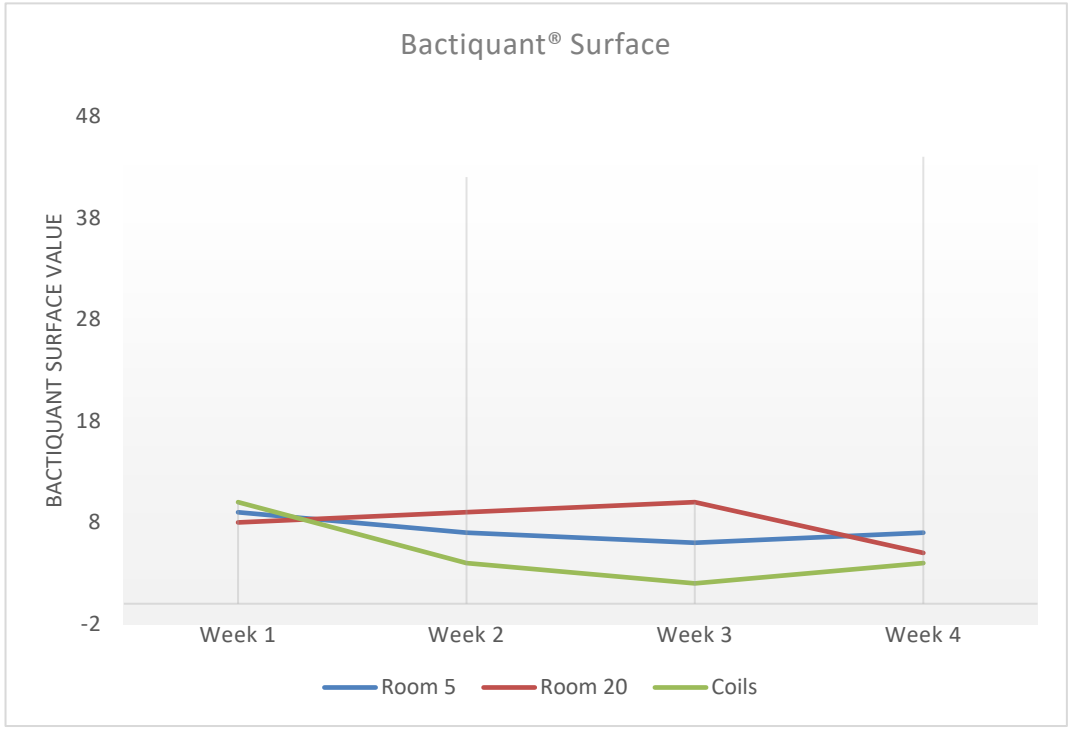


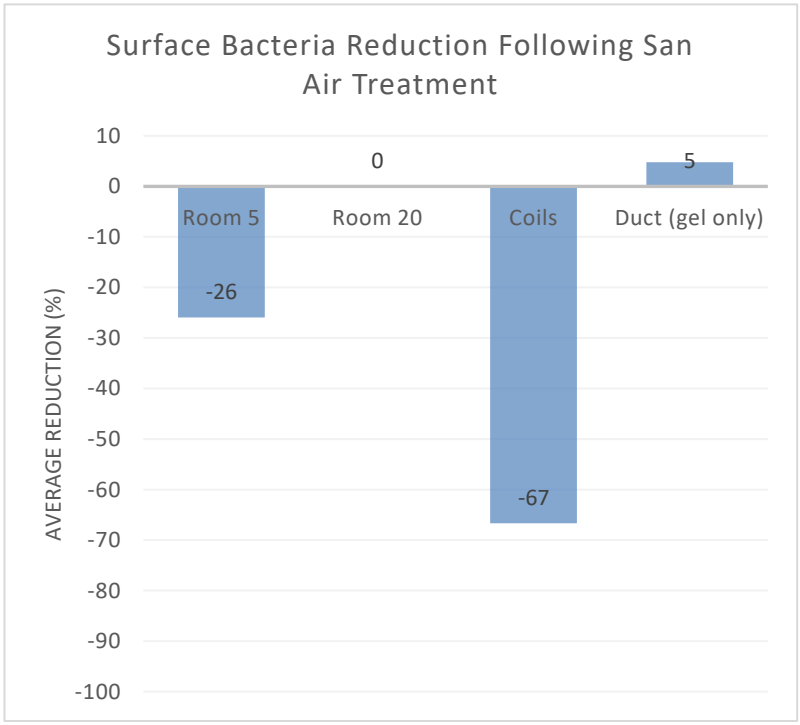


3.3 SURFACE BACTERIA

Bactiquant Surface Value BSV

Car	Location	Week 1	Week 2	Week 3	Week 4	Average Weeks 2-4	Ave Reduction	Ave Reduction %
2377	Room 5	9	7	6	7	6.7	2.3	**26**
2377	Room 20	8	9	10	5	8.0	0.0	**0**
2377	Return Air Coil	10	4	2	4	3.3	6.7	**67**
2374	Duct (gel only)		42		44	44.0	-2.0	**-5**





4. CONCLUSION

Parameter	Target / Objective	Conclusion and Comment	Objective Achieved
Airborne Mould	Airborne mould should be reduced or maintained if San Air treatment objectives are achieved	Airborne mould levels showed a small reduction compared to outdoor levels. It appeared that San Air controlled the amplification of mould indoors. It is likely that due to the introduction of fresh air/air exchange rate by the HVAC system that the San Air treatment may not have had the time to kill airborne mould before air was exchanged. It is likely that in indoor environments with higher air recirculation rates that San Air efficacy would be greater.	Achieved
Surface Mould with surface cleaning	Surface mould should be reduced or maintained if San Air and Surface treatment objectives are achieved	Surface mould showed a significant reduction following the first week. Initial reduction may be attributed to the San Air surface cleaner and maintained by the San Air Gel. Reduction was maintained through to week 4, no re-growth of mould.	Achieved
Surface Mould without surface cleaning	Surface mould should be reduced or maintained if San Air treatment objectives are achieved	Surface mould showed a significant reduction following the two weeks of San Air treatment. All reduction is likely to be attributed to the San Air gel as no surface cleaning was conducted. San Air was able to penetrate the existing bulk surface dust and reduce mould growth.	Achieved

Parameter	Target / Objective	Conclusion and Comment	Objective Achieved
Surface Bacteria with surface cleaning	Surface bacteria should be reduced or maintained if San Air and Surface treatment objectives are achieved	Surface bacteria showed a minor reduction following the four weeks of treatment. Surface bacteria levels were very low (close to or at detection limits) throughout the trial, thus the observed reduction was low. Bacteria are unlikely to be in abundance on a dry, non-porous surface, thus results were expected No amplification of bacteria was observed throughout the trail.	Inconclusive
Surface Bacteria without surface cleaning	Surface bacteria should be reduced or maintained if San Air treatment objectives are achieved	Surface bacteria showed a minor increase / no change following the two weeks of San Air treatment. Surface bacteria levels were very low (close to or at detection limits) throughout the trial, thus the observed reduction was low. Bacteria are unlikely to be in abundance on a dry, non-porous surface, thus results were expected	Inconclusive
Odour	Subjective Odour reduced following San Air treatment.	Testing team noted that musty / mouldy odour was noticeably reduced following four weeks of San Air Gel treatment	Achieved

APPENDIX A: PHOTOS

1. Sleeper Train Carriage 2377

2. Air Sample Location – Outdoor Reference

3, 4. Air Sample Location – Return Air Duct

5. Air Sample Location - Room 5/20

6. Swab Sample Location – Room 20

7. Swab Sample Location – Room 5

8. Swab Sample Location – AC Coil

7. Swab Sample Location – Car 2374 Return Air Duct

APPENDIX B: LABORATORY ANALYSIS CERTIFICATES

Laboratory analysis certificates supplied on request.

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