Airfree® - Leistungstests von unabhängigen Laboren, Instituten und Universitäten der folgenden Länder:

Labor	Local	Reduzierung von Mikroorganismen		
		Pilze	Bakterien	DerP-1
Insect R&D Limited Cambridge, UK june, 2005	Labor			70,6% to 97,95%
SGS Natec Institute* Hamburgo/Germany september to november, 2000	Labor-Büro	99%	99%	
Technical Micronics Control Huntesville/USA april 28 to may 14, 1998	Labor	93%	78%	
Univ. Complutense de Madrid Madrid/Spain october 21, 1997	Klinischen Labor	69%	79%	
AINIA Valença Spain june 9 to august 22, 2003	Kältekammer	86%		
INETI* Lisbon/Portugal january 13 to february 18, 1999	Torre do Tombo Portuguese National Archive	93%	94%	
INETI* Lisbon/Portugal may 7 to june 18, 1999	RTP Video-Archiv	74%	70%	
INETI* Lisbon/Portugal april 3 to may 5, 1998	Bankfiliale	77%		
Univ. Nova of Lisbon june 5, 1998	Labor	90%	62%	
Campana Laboratory/ São Paulo/Brazil april 14 to april 29, 1999	Chemielaboranten	99%	83%	
INETI* Lisbon/Portugal november 12 to december 10, 2004	Geschlossenen Räumen	98%	87%	
INETI* Lisbon/Portugal march 19 to april 30, 2001	Hotelzimmer	92%	82%	

AIRFREE TEST

REPORT REFª: RT.020.00.2010

DATE : JULY 6 , 2010

CLIENT: AIRFREE, LDA.

ADDRESS: Rua Mouzinho da Silveira 27, 5º. A - Lisboa 1250-166 - Portugal

Ambientális

Serviços no âmbito da qualidade do ar interior, nomeadamente avaliações conforme legislação aplicável.

1. OBJECTIVE

The main objective of the test is to evaluate the efficiency of Airfree´s patented TSS ceramic core in destroying microorganisms.

2. METHODOLOGY

The concept of the test is to measure the apparatus' efficiency in destroying airborne microorganisms directly at the ceramic core air outlet employing the manufacturer's TSS – Thermodynamic Sterilization System. The Airfree unit provided by the manufacturer was opened allowing direct access to the ceramic core. An upside-down Petri dish was inserted in a sterilized paper funnel which was attached to the working ceramic core for 120 minutes.

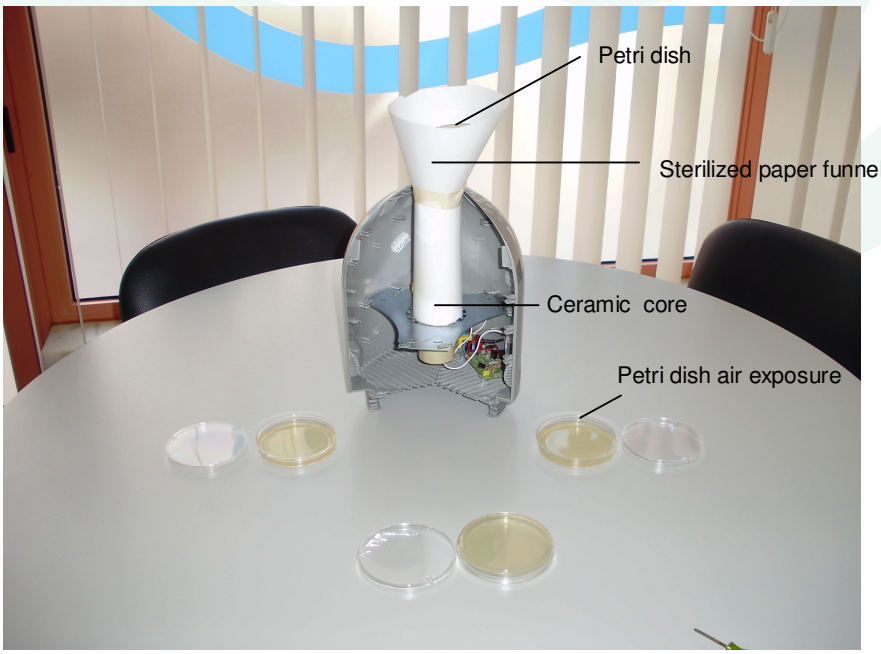

Fig.1- Apparatus

Rua Guilherme Marconi, nº13-5 Loja A , 2620-258 RAMADA
Telefax: 219 345 902 ☼ C.elect.: ambientalis@ambientalis.pt ☼ sítio: www.ambientalis.pt

In order to perform the present study, the number of viable airborne bacteria was quantified in the room chosen by Ambientalis, at Ramada, with the air sterilizer switched off. On June 18th two Petri dishes were exposed before the test start- up (Test 1), thereafter the apparatus was switched on (Test 2).

Tab.1- Equipment, incubation and sampling method

Parameter	Sampling method	Culture means	Incubation temperature/time
Total bacteria	Sedimentation	TSA (Tryptic Soy Agar)	36ºC-2 days

Remarks: samples were duplicated. Result represents the arithmetic average of both readings.

3. RESULTS

3.1. MICROBIOLOGY

Tab.2- Total Bacteria in air

Test	Exposure time	Sampling date	Total bacteria (UFC/dish)
			Results
1 Air contamination in room before Airfree switched ON	2h	June 18, 2010	10
2 Air contamination measured at Airfree air outlet	2h	June 18, 2010	0

Remarks: Before the Airfree was switched on, air sampling was made nearby the apparatus air inlets. After the Airfree was switched on, the air sampling was taken at the ceramic core air outlet (inside the sterilized air paper funnel).

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4. CONCLUSION

The performed test indicates a 100% reduction of airborne bacteria contamination, as described. We can therefore conclude that the TSS ceramic core was 100% efficient in destroying bacteria contamination.

Ramada, July 6 , 2010

Helena Krippahl

(Service Technician)

Translated by Airfree, Produtos Electrónicos Lda.

Rua Guilherme Marconi, nº13-5 Loja A , 2620-258 RAMADA
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Verified by:
Mr Yousef Shokrollah,
General Manager, SHTC LLC

Airfree®
AIR PURIFIERS

Airfree Peaches Test

at

Shokri Hassan Trading Co, Dubai

4 - 28 October 2010

Aim: To assess viability of installing Airfree throughout a large fruit and vegetable storage facility, by measuring real increases in shelf life using Airfree, and investigating the possibility to increase chiller temperature and thus reduce cooling & utility bills

The Test

Duration: 25 days
Subject: Peaches, Class II Grade AA-AAA Origin: Turkey
Test Chillers: 4, 1 with Airfree/3 without
Airfree installation: Berry Room installed with 3 x Airfree WM50+ units in Stainless Steel (wall mounted) in April 2010, and 3 chillers without Airfree

Chiller Sizes:			
	Berry Room	118.485m³	(5.492m x 4.727m x Height 4.564m)
	Chiller 1	297.1m³	(13.815m x 4.712m x Height 4.564m)
	Chiller 2	162.89m³	(9.812m x 6.505m x Height 2.552m)
	Chiller 3	159.05m³	(9.807m x 6.335m x Height 2.552m)

Variables recorded: [1] Fruit Temperature °C (measured using Raytemp 4 Laser thermometer); [2] Chiller Temperature Setting °C (recorded from the SHTC chiller computers); [3] Chiller Ambient Temperature °C (recorded from the SHTC chiller computers); [4] Chiller Wall Temperature °C (measured using Raytemp 4 Laser thermometer)

Method: Trays of peaches from Shokri Hassan Trading's regular stock were used, selected from the same batch at random and placed in the 4 test chillers on 4 October 2010 - Berry Room (Airfree installed) and Chillers 1, 2 and 3 where Airfree was not installed. Photographs and the aforementioned variables were taken initially every second day, and then daily up until 28 October 2010.

Purpose: A significant difference in terms of reduced spoilage was noted by management following the purchase and installation of Airfree units in an area where the most perishable and expensive produce is stored, the Berry Room, in April 2010, and a further study was requested to assess the viability of further investment and extended installation of the Airfree system. The aim of this test was two-fold: (A) to formally assess the viability of installing Airfree throughout all SHTC chilled storage areas by measuring increase in shelf life of Airfree in a fully functional commercial chiller; (B) investigating Airfree's potential to allow for an increase in chiller temperature settings and thus reduce cooling and utility bills.

VARIABLE AVERAGES

[1] Fruit Temperature °C (Measured using Raytemp 4 Laser thermometer)

Chiller	Berry Room WITH Airfree	Chiller 1: WITHOUT Airfree	Chiller 2: WITHOUT Airfree	Chiller 3: WITHOUT Airfree
Average Temperature	0.91°C	**-1.72°C**	**4.93°C**	**3.94°C**

[2] Chiller Temperature Setting °C (Recorded from SHTC Chiller Computers)

Chiller	Berry Room WITH Airfree	Chiller 1: WITHOUT Airfree	Chiller 2: WITHOUT Airfree	Chiller 3: WITHOUT Airfree
Average Temperature	4°C	**4°C**	**4.92°C**	**5°C**

[3] Chiller Ambient Temperature °C (Recorded from SHTC Chiller Computers)

Chiller	Berry Room WITH Airfree	Chiller 1: WITHOUT Airfree	Chiller 2: WITHOUT Airfree	Chiller 3: WITHOUT Airfree
Average Temperature	8.11°C	**5.46°C**	**5.83°C**	**7.74°C**

[4] Chiller Wall Temperature °C (Measured using Raytemp 4 Laser thermometer)

Chiller	Berry Room WITH Airfree	Chiller 1: WITHOUT Airfree	Chiller 2: WITHOUT Airfree	Chiller 3: WITHOUT Airfree
Average Temperature	1.58°C	**-1.05°C**	**5.53°C**	**4.2°C**

SNAPSHOTS

Day 1

Berry Room WITH Airfree:

Chiller 1 WITHOUT Airfree:

Chiller 2 WITHOUT Airfree:

Chiller 3 WITHOUT Airfree:

Day 8

Berry Room WITH Airfree:

Chiller 1 WITHOUT Airfree:

Chiller 2 WITHOUT Airfree:

Chiller 3 WITHOUT Airfree:

Day 15

Berry Room WITH Airfree:

Chiller 1 WITHOUT Airfree:

Chiller 2 WITHOUT Airfree:

Chiller 3 WITHOUT Airfree:

Day 25

Berry Room WITH Airfree:

Chiller 1 WITHOUT Airfree:

Chiller 2 WITHOUT Airfree:

Chiller 3 WITHOUT Airfree:

First visible Mould in Chillers WITHOUT Airfree

Day 9 – Chiller 1 WITHOUT Airfree

Day 6 – Chiller 2 WITHOUT Airfree

Day 8 – Chiller 3 WITHOUT Airfree

Chiller WITH Airfree completely Mould-free on Day 25

Day 25 – Berry Room WITH Airfree

Conclusions

Shelf Life: The peaches in the Berry Room, the chiller with Airfree installed, remained in a saleable condition for the entire 25 day period, with no signs of mould or decomposition at all. Peaches in all 3 control chillers (pictures as above) were affected by mould and decomposed - Chiller 2 mould was visible by Day 6, in Chiller 3 mould was visible by Day 8, and in Chiller 1 mould was visible by Day 9. It can therefore be concluded that Airfree extended shelf life for between 16 to 19 days in this 25 day study.

Airfree therefore extended shelf life of the peaches by more than **4 times** in Chiller 2, more than **3 times** in Chiller 3, and **2.5 times** in Chiller 1, **averaging more than 3 times increase in shelf life.**

Savings through reduced cooling and increased chiller temperatures: It was noted that average temperatures as recorded in Chiller 1 ***were colder*** than the Berry Room, and thus the peaches should have lasted longer. Airfree achieved impressive shelf life extension in ***warmer*** conditions in the Berry Room than Chiller 1. Despite running at an average ambient chiller temperature of **2.65°C *higher***, shelf life was over **2.5 times *longer***. This figure is reconfirmed by the fruit temperature statistics - the peaches in the Berry Room were on average **2.63°C *higher*** than in Chiller 1.

It can therefore be concluded that using Airfree, a company storing fruit and vegetables can *increase* temperature settings in their chillers by at least 2.5°C, and STILL achieve shelf life extension of at least 2.5 times.

*****Peaches from Chillers 1, 2 and 3 were discarded on Day 25 at the end of the study. Peaches from the Berry Room were retained for the purposes of further research into the full shelf life extension possible using Airfree. These peaches were inadvertently discarded on Day 32 albeit it was noted that they were still mould-free when pictures were taken earlier that day (see below). It can therefore be concluded that Airfree extended shelf life for between 23 to 26 days, indicating more than 3.5 to 5 times extended shelf life over produce stored without Airfree.

Day 32 – Berry Room WITH Airfree

Insect R&D Limited

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Incorporating

Medical Entomology Centre

Report on the effectiveness of the Airfree air steriliser manufactured under license of US Patent 5874050 at reducing the levels of Der p 1 (A major house dust mite allergen) on allergen placed within it for varying lengths of time.

Phase 1

Report No. Air/Mit/All/1

Compiled by

Toby C Wilkinson

June 2005

This report consist of 7 numbered pages of which this is the first

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Registered in England Registration No. 4375595 VAT No. 783 9593 63
Cambridge House, Barrington Road, Shepreth, Royston, Herts SG8 6QZ
Tel: +44 (0)1763 2463011 Fax: +44 (0)1763 263022

Disclaimer

The results described in this report were generated *in vitro*. The samples tested were accepted in good faith that they were representative of the intended final formulation(s)/ product(s) and the test methods employed were used on the understanding that they were the most appropriate available at the time the tests were agreed. As such the results should be taken only as an indication of the potential for activity of the formulations or products under test. These results cannot be considered as confirmation that a formulation or product will work in a clinical or field application. Evidence for such activity can only be obtained from properly constructed and executed clinical or field trials.

Use of this report

This report may be used as part of a portfolio of documentation by the sponsoring organisation. It may be used as part of a submission for regulatory application or as a reference only as "Data on File" in any promotional material.The name of Insect Research & Development Limited, Cambridge, may only be used in advertising or other promotional material with the prior consent of the Directors of the company. It should be noted that Insect Research & Development Limited is an independent consultancy and contract research organisation.

Aim

The aim of these experiments was to assess the effectiveness of the Airfree device at reducing the levels of Der p 1 (A major house dust mite allergen) in allergen placed within it for varying lengths of time.

Materials and methods

House dust mite allergen, derived from colonies of the house dust mite *Dermatophagoides pteronyssinus*, maintained by Insect Research and Development ltd was placed into the centre of the incinerator for 1, 5 and 300 seconds using a probe. All of the experiments were conducted in a controlled climate chamber set to 25°C and 75% RH. The probe was constructed from straight metal wire measuring 120 mm with a diameter of 0.75 mm, a 5mm by 10 mm strip of autoclave tape was wrapped around the wire leaving an exposed surface of 2mm by 10mm. Approximately 0.001 grams of frozen culture containing high levels of allergen was placed onto this surface, calculations in the results section will take this variation into account. The incinerator was placed in the upright position and turned on for 24 hrs prior to the addition of the probes. The allergen was placed into the centre of the incinerator, through a small hole made in the grill at the bottom for 1,5 and 300 seconds (see figure 1), 3 replicates were conducted at each time interval and 3 control replicates were carried out at each time interval with the Aifree device switched off so the incinerator was at room temperature (25°C). The incinerator was 13 cm long so the tip of the probe was placed 7cm within it, in the central hole. The centre of the autoclave tap was inline with the centre of the incinerator.

After being placed in the incinerator the autoclave tape was gently removed from the wire and placed into a 25ml water tight container containing 5ml of dust extraction buffer (0.125M ammonium hydrogen carbonate buffer + 0.1% sodium azide). The container containing the allergen and dust extraction buffer was spun with a blood rotator for 1 hour. 1ml of liquid from each arena was then transferred to labelled Eppendorf tubes using a micro-pipette, and centrifuged at 6000rpm for 5 minutes. The supernatant liquid (0.2 ml) was removed from each Eppendorf tube and transferred to a new, labelled Eppendorf tube, after this the tubes were frozen until they were analysed for Der p 1.

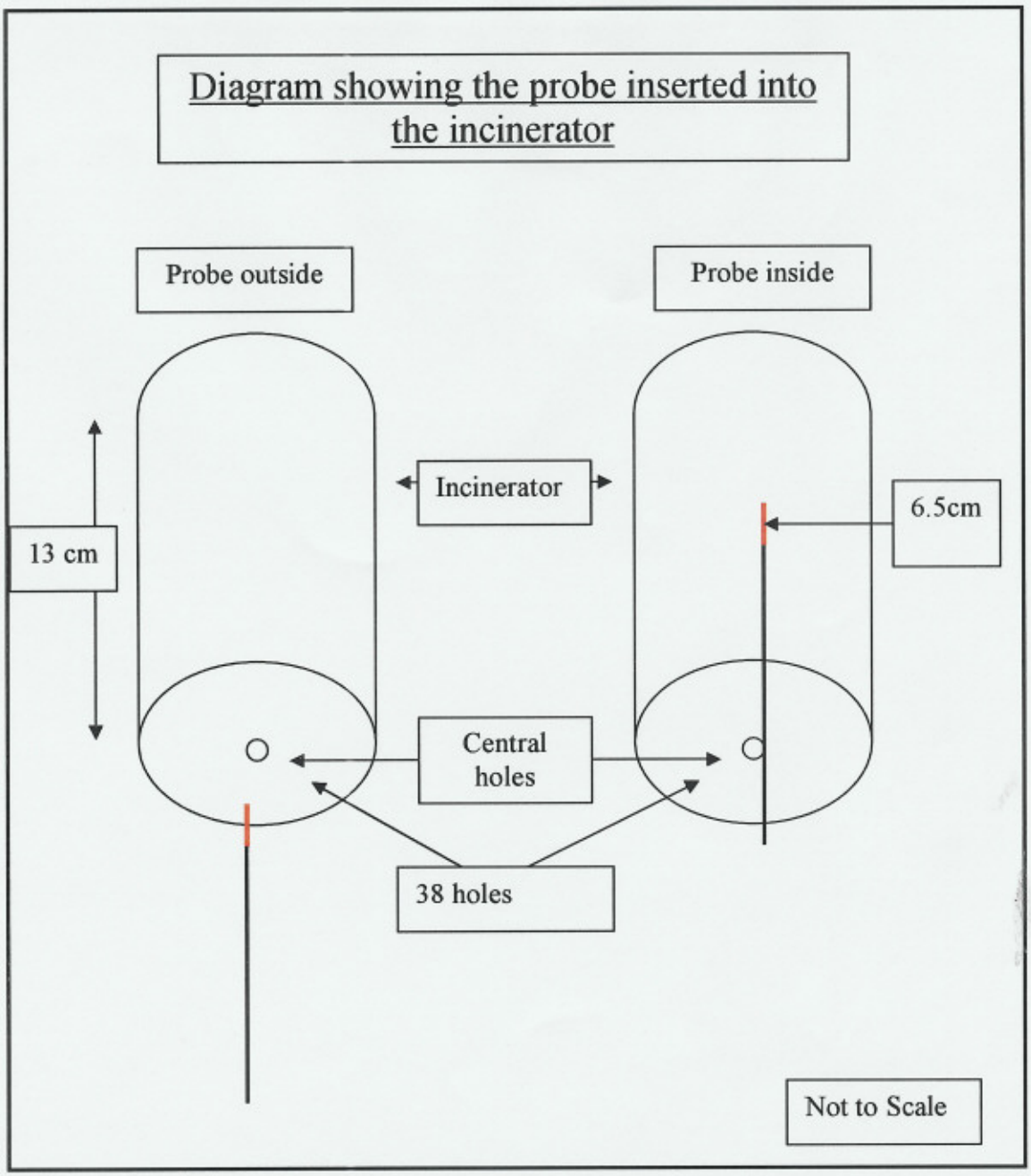


Fig 1: Diagram showing probe being inserted into the incinerator.

Results (corrected)

Exp/Control	Mean ng Der p 1	% Reduction
5 min exposure	6.82	97.95
5 min control	332.47	
5 second exposure	31.03	93.45
5 second control	473.47	
1 second exposure	169.66	70.60
1 second control	577	

Table 1: Results

Results and discussion

The results indicate that the Airfree device has the potential to control the airborne house dust mite allergen Der p 1 extremely well. After just one second, the time which air/ airborne allergens are thought to remain in the incinerator, the Airfree device was able to reduce the amount of the house dust mite allergen Der p 1 by an average (mean) of 70.6%. In the field the airborne allergen may be denatured even more as quite a lot of allergen was placed on the probe, some of the allergen on the probe may therefore have shielded the allergen beneath it from the heat. It was interesting to see that the longer the control samples were placed within the incubator the less allergen was detected on them, as the incubator was switched off it is likely that this reduction was caused by some of the allergen being rubbed off the probe. Longer exposure periods with the incinerator switched on resulted in higher % reductions in allergen concentrations when compared to the control, this indicates that repeated exposure to the

incinerator would reduce the amount of allergen further, although more tests would need to be conducted to confirm this.

SINCE 1896

REPORT
INTERTEK ETL-SEMKO DIVISION

1717 Arlingate Lane COLUMBUS, OHIO 43228

PROJECT NO.:3129022 DATE: August 24, 2007

REPORT NO. 3129022COL-001

RENDERED TO:
C&M Airfree Products
Rua Mouzinho da Silveira, 27-5C
1250-166 Lisbon, PT

STANDARD REFERENCED AND TEST METHOD: ITS Non-Standardized Test: Microbial/Viral Reduction Rate.

AUTHORIZATION: The test was authorized by Carlos Matias; A representative from C&M Airfree Products.

SPECIMEN DESCRIPTION: The test performed was the Microbial Reduction Rate conducted at the Intertek microbiology lab in Columbus, Ohio. The Air Purifier was tested for its ability to reduce the number of microorganisms in a test chamber. The sample was received on June 23, 2007 and is currently a production model. The test chamber was contaminated with *Serratia marsescens*, *Aspergillus niger*, *Penicillium citrinum* and MS2.

TEST DESCRIPTION

Nutrient agar was prepared for the bacteria cultures, potato dextrose agar was prepared for the fungus and mold cultures and tryptic soy agar was prepared for viral cultures.

All agars were sterilized using an autoclave to a temperature of 121°C.

The bacterial cultures were prepared using pre-grown cultures acquired from ATCC (American Type Culture Collection with respective numbers describing each microorganism).

Using an inoculating loop, the cultures were transferred daily in nutrient/potato dextrose/yeast broth for not more than two weeks. Nutrient broth was used for the growth of bacteria and some viruses. Potato dextrose broth was used for the growth of fungi. Yeast broth was used for the growth of mold. At the conclusion of two weeks, a fresh transplant from stock culture was made. Bacterial cultures were incubated at 37 $\pm$ 2°C for 24 hours. Fungal cultures were grown at 28-30°C and 85% relative humidity for 28 days. Mold cultures were grown at 30-32°C and 85 % relative humidity for 28 days.

The stock cultures were maintained on nutrient agar. Cultures were stored at 5 $\pm$ 1°C and transfer once a month.

This operation was completed for each microorganism.

Samples were set in the center of the testing room. Activation was performed either by remote control or by manipulation of the power source from outside the chamber.

The microorganisms were measured to the specified amount to achieve the threshold of 1 x 10^8. The microorganism was then added to sterile buffered demineralized water (SBDW), pH of 7.2 +/- 0.2. This combination was then put into the collision nebulizer.

The collision nebulizer was then put into the test chamber where it was attached to an Erlenmeyer vacuum flask and a nitrogen tank. The nozzle of the flask pointed outward toward the room.

The room (411.4 cubic feet) was now sealed and a negative control was taken. This ensures that there were no other microorganisms in the test chamber prior to testing.

The nitrogen for the aspirator was set and started for aspiration into the test chamber.

A positive control sample of the air was now to be taken. This provided reaffirming data that the correct amount of the microorganism was put into the test chamber.

Samples were taken every 15 minutes from the air sampler that was attached to the chamber wall. The agar plates were put into the air sampler and the microorganism was vacuumed onto the plate.

The bacteria and viral samples were then put into the incubator at 37 $\pm$ 2°C and allowed to grow for 48 hours. The fungal samples were put into the growth chamber at 28-30°C and 85% relative humidity and allowed to growth for 2-3 days. The mold samples were put into the growth chamber at 30-32°C and 85 % relative humidity and allowed to grow for 2-3 days.

This process was repeated as above, this time the air cleaner was turned on at time zero or when you take the first sample. These results were then compared to the natural decay of the microorganism to arrive at percent reduction.

This Intertek procedure is typically run on a two hour time frame with samples taken at 5 minute intervals. Mr. Carlos Matias requested the test be run for four hours with samples taken at 15 minute intervals.

CALIBRATED EQUIPMENT:

CE 1141- Micropipette (Fisherbrand)
CE 1142-Environmental Chamber (Thermotron) Model SM 3.5S
CE 1155-Incubator (Precision)
CE 1140-Environmental Chamber (LR Technologies)

RESULTS:

The negative controls showed no signs of growth.

The positive controls showed complete growth over the agars surface. The original number of each microorganism aspirated into the chamber was 1 x 10^8 cfu/ml.

S. marsescens has shown;

A 63.2% reduction from the natural decay at 165 minutes

REPORT NO.:3129022-COL-001 DATE: August 24, 2007

A. niger has shown;
No reduction is able to be determined

P. citrinum has shown;
At least a 78.8% reduction from the natural decay setting at 195 minutes

MS2 has shown:
A 54.4% reduction from the natural decay setting at 150 minutes

Please see following pages for raw data breakdown.

CONCLUSION: This report documents the performance of the Air Purifier. The microbiological test sample evaluations were conducted at the Intertek laboratory located in Columbus, OH between August 2, 2007 and August 15, 2007.

Serratia marsescens

Time (minutes)	Natural Decay (colonies) CFU	Air Purifier (colonies) CFU
0	TNTC	TNTC
15	TNTC	TNTC
30	TNTC	TNTC
45	TNTC	TNTC
60	TNTC	TNTC
75	TNTC	TNTC
90	TNTC	TNTC
105	TNTC	TNTC
120	TNTC	946
135	494	255
150	380	160
165	334	123
180	235	95
195	144	80
210	106	72
225	75	53
240	14	12

TNTC: TOO NUMBEROUS TO COUNT > 1000 COLONIES

REPORT NO.:3129022-COL-001 DATE: August 24, 2007

Aspergillus niger

Time (minutes)	Natural Decay (colonies) CFU	Air Purifier (colonies) CFU
0	TNTC	TNTC
15	TNTC	TNTC
30	TNTC	TNTC
45	TNTC	TNTC
60	TNTC	TNTC
75	TNTC	TNTC
90	TNTC	TNTC
105	TNTC	TNTC
120	TNTC	TNTC
135	TNTC	TNTC
150	TNTC	TNTC
165	TNTC	TNTC
180	TNTC	TNTC
195	TNTC	TNTC
210	TNTC	TNTC
225	TNTC	TNTC
240	TNTC	TNTC

TNTC: TOO NUMBEROUS TO COUNT > 1000 COLONIES

REPORT NO.:3129022-COL-001R DATE: August 24, 2007

Penicillium citrinum

Time (minutes)	Natural Decay (colonies) CFU	Air Purifier (colonies) CFU
0	TNTC	TNTC
15	TNTC	907
30	TNTC	694
45	TNTC	542
60	TNTC	490
75	TNTC	410
90	TNTC	362
105	TNTC	257
120	TNTC	331
135	TNTC	284
150	TNTC	284
165	TNTC	242
180	TNTC	231
195	TNTC	212
210	136	125
225	126	95
240	96	80

TNTC: TOO NUMBEROUS TO COUNT > 1000 COLONIES

REPORT NO.:3129022-COL-001R DATE: August 24, 2007

MS2

Time (minutes)	Natural Decay (colonies) CFU	Air Purifier (colonies) CFU
0	TNTC	TNTC
15	TNTC	TNTC
30	TNTC	TNTC
45	TNTC	699
60	TNTC	677
75	853	620
90	837	550
105	756	372
120	723	357
135	671	322
150	583	266
165	526	264
180	477	240
195	310	221
210	197	200
225	159	121
240	140	111

TNTC: TOO NUMBEROUS TO COUNT > 1000 COLONIES

Test Performed by:

Shannon Meier
Microbiologist

Report Approved by:

Ramzi Amawi
Engineering Manager

KIBSONS
INTERNATIONAL LLC

Michael Cunningham,
Commercial Director,
Airfree (Amancorp Ltd)

22nd June, 2009

Dear Michael,

I confirm that, after a successful trial of Airfree technology at our Al Aweer facilities, we are delighted to exceed the minimum purchase agreement set out before we began and install Airfree units throughout our Al Aweer facility and in 10 chiller units at our main produce storage facility in Ajman.

I note that mould levels before Airfree units were installed in the subject commercial chiller unit at Al Aweer were a maximum of 273 cfu, and dropped over the 5 week trial period with Airfree in operation to a minimum of 36 cfu, equating to a decrease of 86.8%.

The subject chiller was in constant use throughout the trial period and no special concessions to our ordinary commercial operations were made.

Airfree has shown itself to be a profitable investment for our fresh food business, and shown proven increased shelf life for both Kibsons and our clients' benefit, where the increased freshness of our products can only re-enforce our reputation for excellence in the market.

Yours sincerely,

P.B.5313 DUBAI-U.A.E. KIBSONS INTERNATIONAL L.L.C.

Daniel Cabral, Procurement Manager

Kibsons International LLC

Shop #59, Wholesale Building 2, Central Fruit & Vegetable Market, Aweer.
P.O.Box: 5313, Dubai - U.A.E. Tel: 971 - 4 - 3202727 Fax: 971 - 4 - 3202191
www.kibsons.com

SGS NATEC Institut
für naturwissenschaftlich-technische Dienste GmbH

Div. Microbiology, Behringstraße 154, D-22763 Hamburg

NA 00 0338

C & M Representacoes, Lda., Lisboa, Portugal

By order of C & M Representacoes, Lda, Lisboa, Dr. Carlos Matias, of August, 2000 we executed during September to November 2000 air analyses in two different rooms of the NATEC Institut. These rooms are office rooms with normal equipment, with carpets and air condition.

In each of the rooms, which are of ca. 30 m^3, it has been installed an Airfree Air Sterilizer. Concerning the technical installation we acted according to the polyglot prospectus which had been put at our disposal, called „Airfree Air Sterilizer".

During 6 weeks which the apparatus was running in the two rooms, it has been determined at the beginning and at the end of each week the total colony count respectivel yeasts and moulds, with petri-dishes (1/2 h. opening for sedimentation) as well as with an airsampler of RCS.

Results:

The results have been stated according to each room on two different pages, and they are showing that from the beginning of installing a continuous reduction, especially of the total colony count, can be observed, whereas these values are stated especially at examination of the airsampler per m^3.

After 6 weeks of continuous running of the Airfree Air Sterilizer the apparatus has been stopped, and for further 4 weeks the air in both rooms has been examined with both methods. The results are showing that after stopping of the Airfree Air Sterilizer the total colony count, but also the number of moulds, in the air of the rooms clearly increased.

Summary:

Due to the obtained results it can be confirmed a microbiological improvement of the air in rooms under continuous running of the Airfree Air Sterilizer.

Hamburg, 15th November, 2000

NATEC Institit
für naturwissenschaftlich-
technische Dienste GmbH

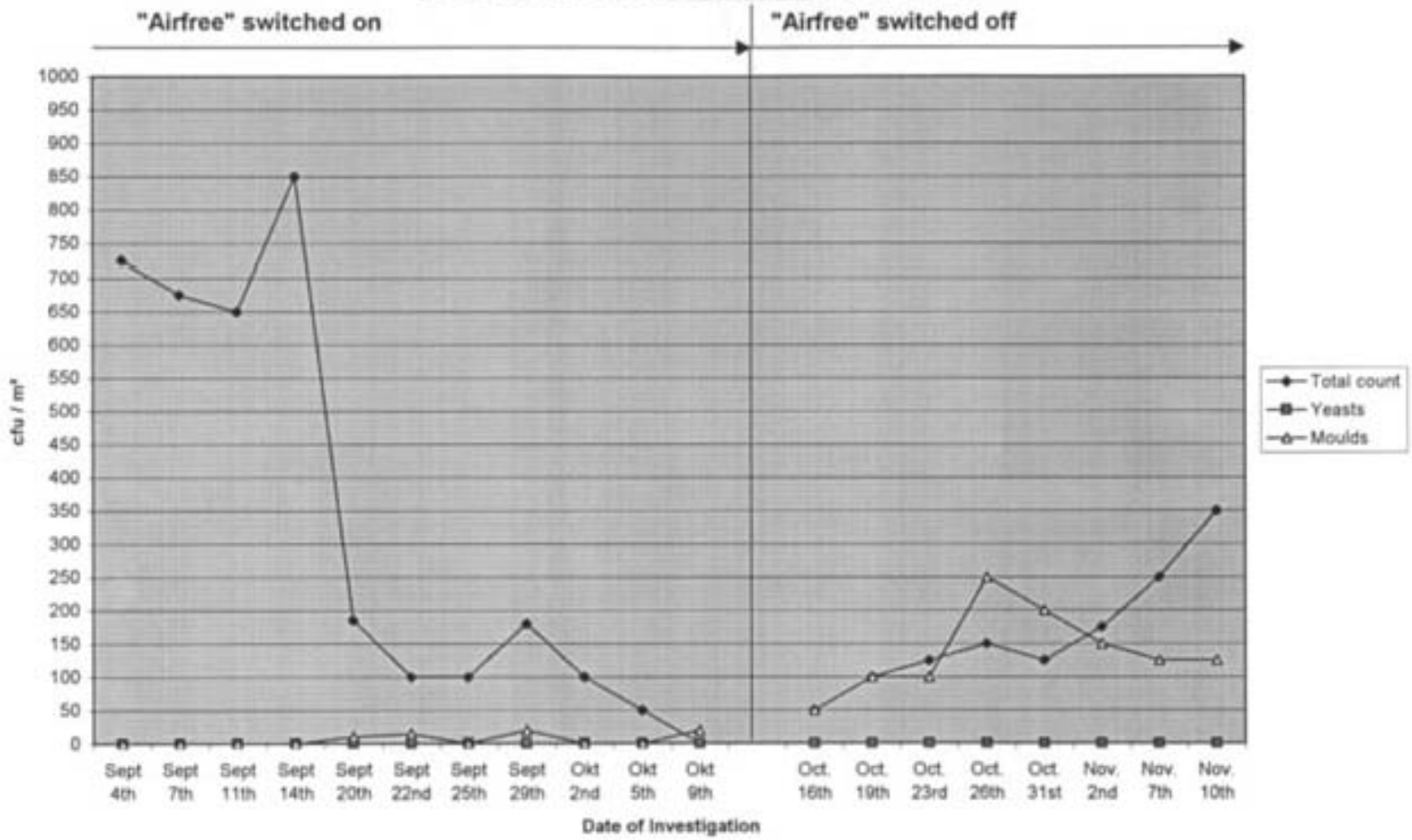
Dipl.-Biol. Regina Zschaler

Akkreditiert nach
DIN EN 45001
für die in der Urkunde
genannten Prüfarten
und -verfahren

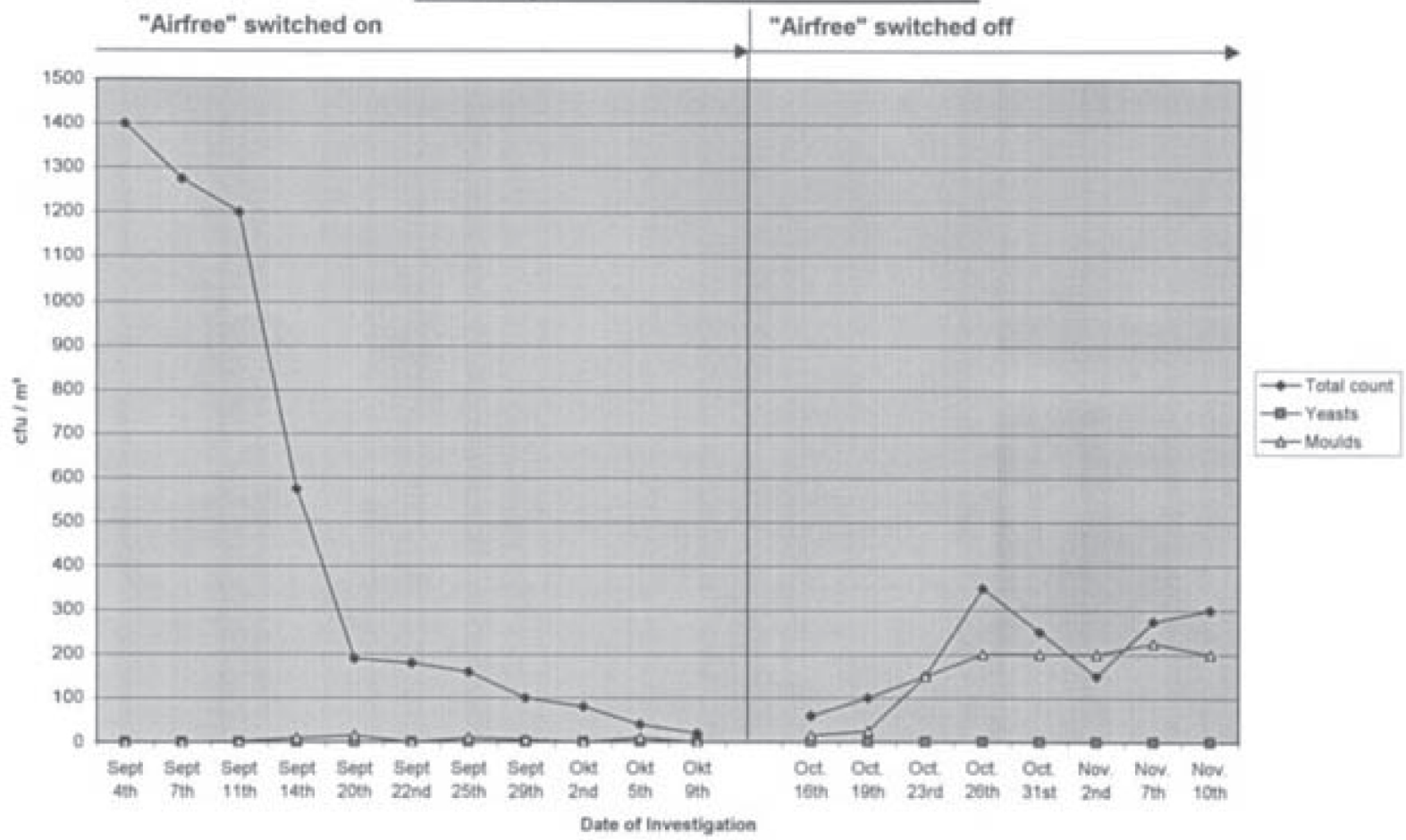
DAP-P-01.311.00-95-01

DIN EN ISO
9001
zertifiziert

Test-Report M00-04990 / Room No. 9



Test-Report M00-04990 / Room No. 11



REPORT

C&M
Rua Mouzinho da Silveira 27, 5th floor
1250-166 Lisbon
PORTUGAL

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Lars Rosell, Chemistry and Materials Technology
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Datum / *Date*	Beteckning / *Reference*	Sida / *Page*
2001-05-31	F1 10358	1 (1)

Measurements of ozone in the outlet of an AirFree air cleaner

Item tested and test objective

The test object was an AirFree air sterilizer, labelled 230 V, 50 Hz, 400 mA, 46 W and serial no 53002309. According the client the AirFree unit is manufactured under license of U.S. Patent 5,874,050. The unit arrived to SP on February 27, 2001. The objective was to check for any change of ozone concentration in the air when passing through the test item. The test was performed on May 29, 2001. The test results apply only for the item tested.

Test procedure

The test was carried out in a laboratory room at SP. The air cleaner was started two hours previous the ozone test. The ozone instrument used for measurements was a Dasibi UV-instrument, model 1003-PC, and newly calibrated. The background ozone level in the room was measured at the base of the Airfree unit and compared with concentrations at the air outlet on top of the unit. Ten readings were taken at both sampling points during 8 minutes respectively and the average for each point was calculated.

Results

The average ozone reading was 19.5 ppb at the inlet and 14.4 ppb at the outlet.

Summary

The ozone concentration was significantly lower (at 99 % certainty level) at the air outlet of the AirFree unit compared to the inlet. The reduction could, at the given test environment, be calculated to 26 %.

SP Swedish National Testing and Research Institute
Organic Analytical Chemistry

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REPORT

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2001-03-07

Beteckning / *Reference*
ETs P1 01230A
Rev 1

Testing of particle concentration up- and down-stream of AirFree

Items tested

Air cleaner AirFree, 230 V, 50 Hz, 400 mA, 46 W, Serial # 53002309. The item arrived to SP on Febuary 27, 2001 in good condition. The air cleaner was on for eight days before testing to get rid of initial emissions. The test results apply only for the item tested.

Place and date of testing

The test of particle concentration was carried out at SP's Energy Technology / HVAC laboratory in Borås on Mars 7, 2001. The air cleaner was tested in a mechanically ventilated office without any known moisture damages. A person was present during the test.

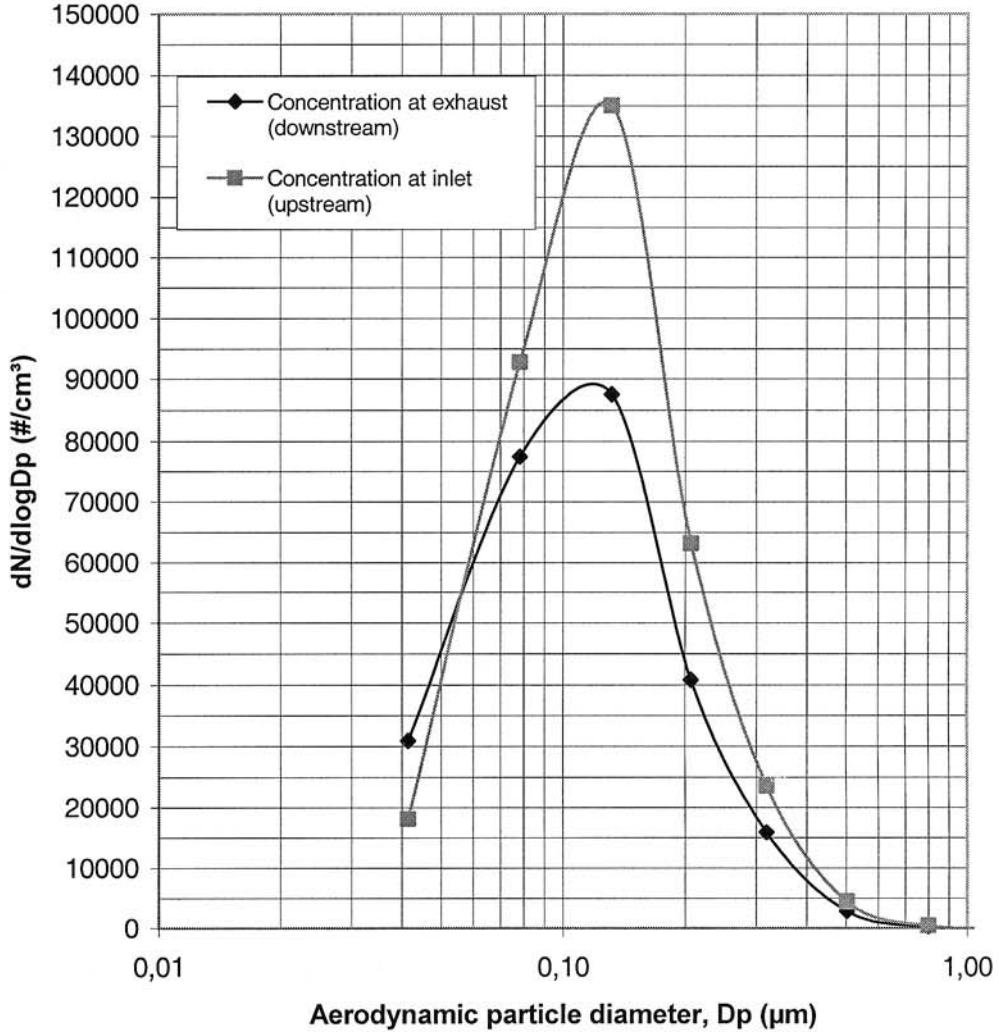
Test procedure

The air cleaner was placed on a desk. The concentration was measured by altering between up- and down-stream (15 mm above the outlet in the center) of the air cleaner. An ELPI (Electrical Low Pressure Impactor, Dekati FIN) was used to measure numbers and sizes of the particles.

Figure 1. Test set up.

Results

The relative humidity of the air in the office was 20 %, the temperature was 23.5 °C and the atmospheric pressure was 1000 mbar. The power consumption for the air cleaner was 46 W.



Graph 1. Particle concentration up- and down-stream of air cleaner.

	0,04	0,08	0,13	0,21	0,32	0,50	0,80	1,27	2,00	(µm)
Ratio	1,71	0,84	0,65	0,65	0,67	0,64	0,62	0,56	0,58	

Table 1. Ratio between downstream and upstream concentration.

Measurement equipment

- Particle counter ELPI, impactor 2125 (SP's inventory no. 202 259)
- Temperature and humidity meter TESTO 610 (SP's inventory no. 201 392)
- Power-meter EMU 1.44, (SP's inventory no. 202 197)
- Barometer Druck DPI-260, (SP's inventory no. 201 637)

Estimated uncertainties of measurement

- Relative humidity ± 3 %-RH
- Dry temperature ± 1 °C
- Power consumption ± 1 W

SP Swedish National Testing and Research Institute
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FINAL REPORT

Efficacy of an Air Sanitizer

PROTOCOL
As per Clients Instructions

ORDER Number
371106146

PREPARED FOR:

Airfree Products
RUA Mouzinho Da Silveira
Lisboa, Portugal
PT

EMSL Analytical, Inc.
200 Rt. 130 N, Cinnaminson, NJ 08077
Phone: (856) 858-4800 Fax: (856)786-0262 Web: http://www.emsl.com

Certificate of Analysis

Client: Airfree Products

Contact: Daniel Matias
Project: Efficacy of an Air Sanitizer

Product : P2000
EMSL NO: 371106146

Sample received: 5/19/2011
Start date: 5/31/2011
Report date: 8/23/2011
Challenge Room: EMSL Building 108 Haddon Ave, Westmont, New Jersey, USA.

Experimental Summary: The testing procedure was designed after discussions between EMSL Analytical, the testing company, and the client, Airfree Products. The testing procedure is based on the clients request with the testing conducted in a mold and bacteria contaminated room for 8 weeks. The testing was conducted in our Cinnaminson Microbiology Laboratory.

Procedure:

The room selected for testing was an office size 3.65m x 4.57m in one of our company's older buildings. The workers of this building recently moved into a new building and thus the room is currently vacant. As seen in the photos (Fig. 1.1) there are two big windows, a door to the outside and another larger entrance way into the room. The room is carpeted and there is an exhaust system on the ceiling. Samples were collected in triplicate twice a week at the same time for the first two weeks to determine baseline fungi and bacteria counts. An Anderson air sampler was utilized for air sampling and run for 4 minutes at 25 L/m. Bacteria were collected on Tryptic Soy Agar (TSA) and incubated at 30°C for 48 h, while fungi were collected on Malt Extract Agar (MEA) and then incubated at 25°C for 96 h. After two weeks the Airfree P2000 air sanitizer was turned on and allowed to run continually for 4 weeks. During this time samples were similarly collected in triplicate twice a week using the Anderson air sampler. Once the last sample was collected the air sanitizer was turned off and air samples were continued to be collected for 2 more weeks. Following incubation

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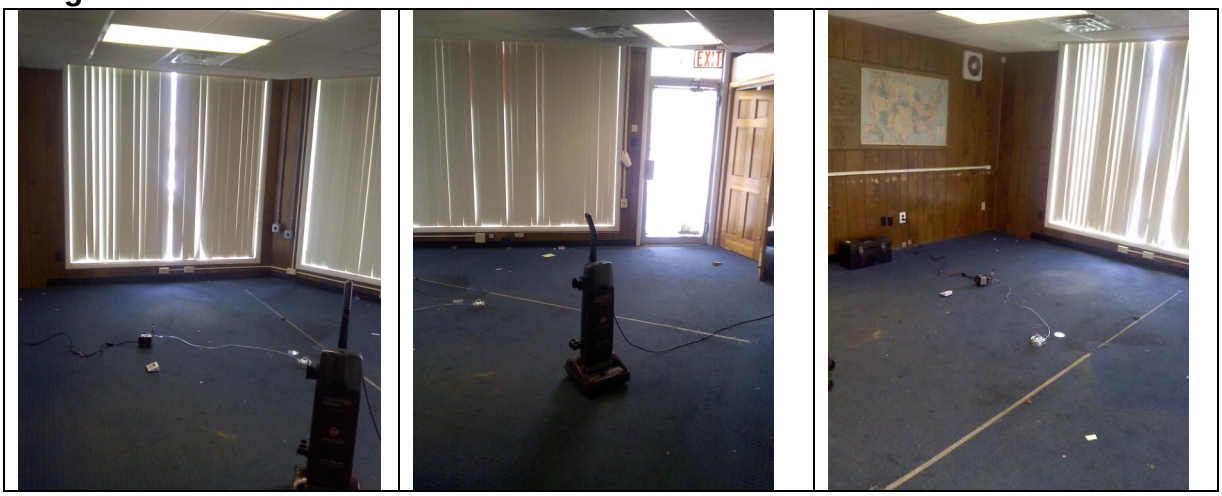
of TSA and MEA plates all colonies were counted and recorded into a spreadsheet for further statistical calculations.

Fig. 1.1



Experimental Results:

Table 1.1 Initial and Final Counts of Fungi and the Correspondent Percent Reduction

Average Initial Counts (CFU/m^3)	Average Final Counts (CFU/m^3)	%Reduction
560	170	69.64%

Counts were the average of three collections from the initial and final days of operation of the Air Sanitizer
%Reduction is the percent difference from the average initial counts and the average final counts

Table 1.2 Initial and Final Counts of Bacteria and the Correspondent Percent Reduction

Average Initial Counts (CFU/m^3)	Average Final Counts (CFU/m^3)	%Reduction
533	80	85.0%

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Counts were the average of three collections from the initial and final days of operation of the Air Sanitizer
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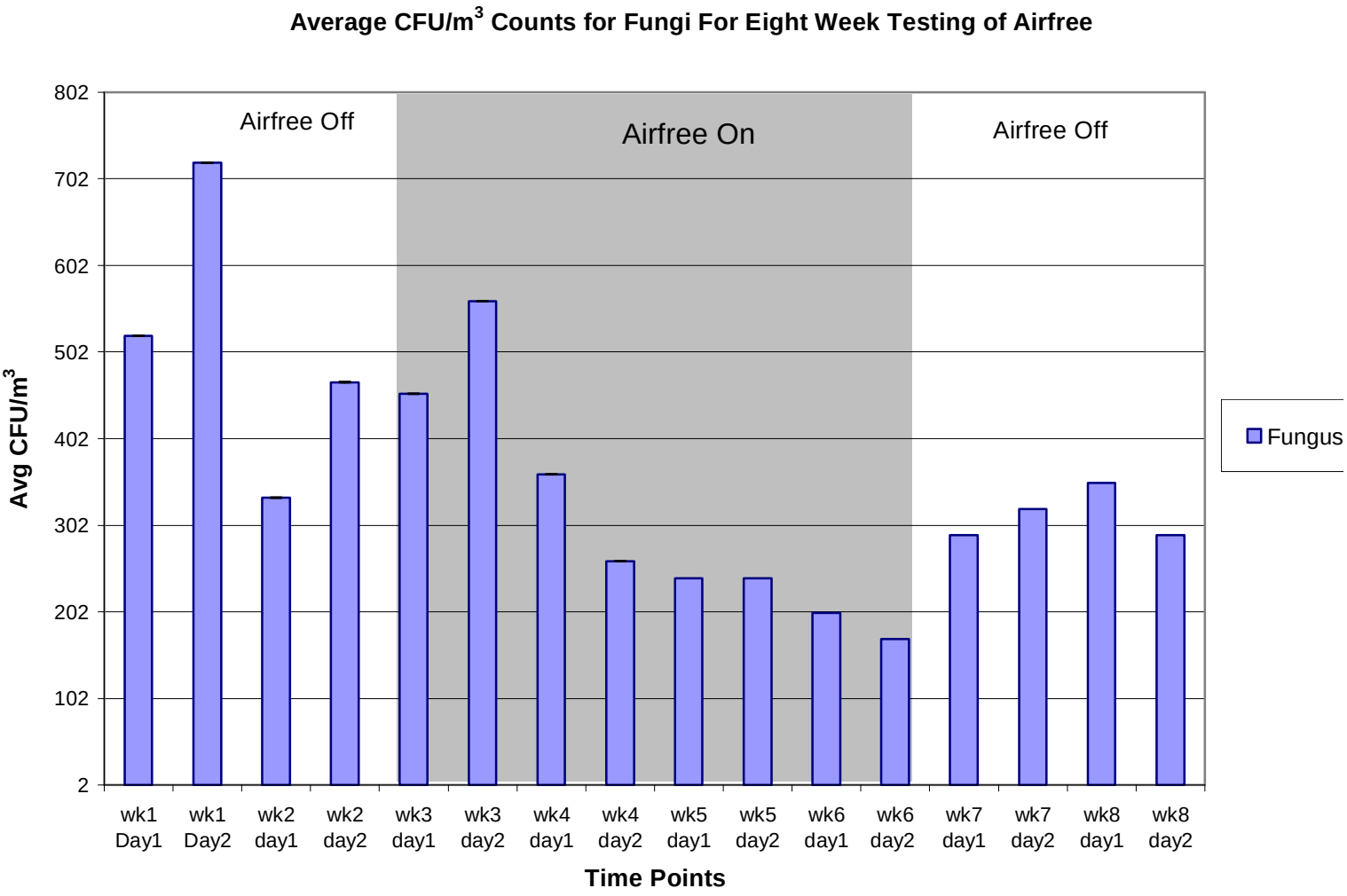
Fig. 1.1



[a] Each point is the average of three collections represented in CFU/m ^{3}

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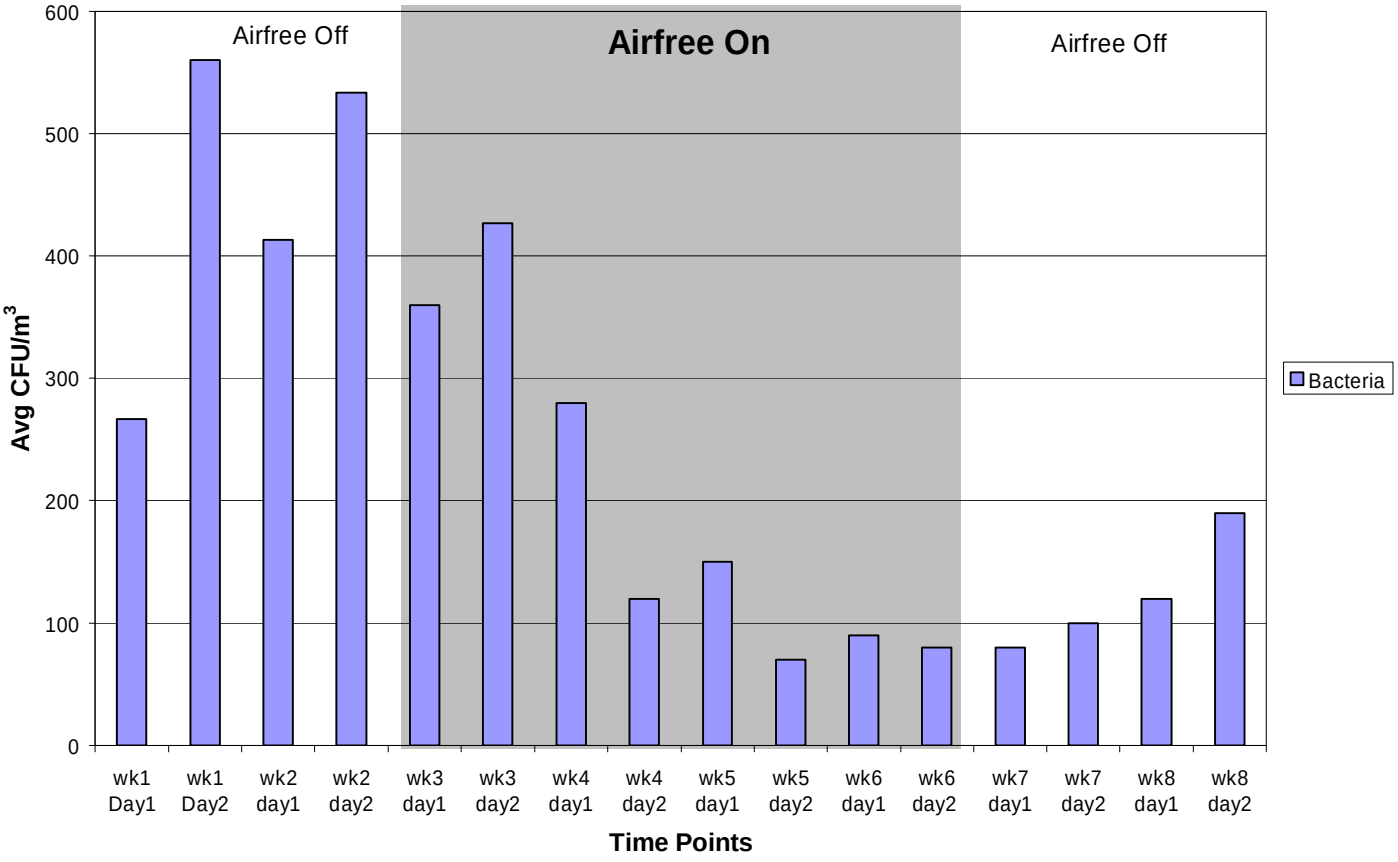
Fig. 1.2

Average CFU/m3 Counts for Bacteria For Eight Week Testing of Airfree



[a] Each point is the average of three collections represented in CFU/m ^{3}

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Conclusions/Observations:

The P2000 air sanitizer by Airfree Products was tested for its efficacy at disinfecting (killing) bacteria and fungi in an office room. It was observed that the starting bacteria counts were 533 CFU/m^3 and fungi counts were 560 CFU/m^3 when the air sanitizer was initially turned on (Table 1.1 and 1.2). Once the P2000 air sanitizer was turned on, as emphasized in Fig 1.1, a decrease in the density of fungi and bacteria were observed with an ultimate reduction coming in the final week. After 4 weeks the air sanitizer was turned off and the fungi and bacteria were observed to increase in density, hinting towards the efficacy of the air sanitizer.

In conclusion, the P2000 air sanitizer was observed to reduce bacteria by 85.0% and fungi by 69.64% for the four weeks it was turned on (Fig. 1.1 and 1.2).

Farbod Nekouei, M.S., Laboratory Manager
or Other Approved Signatory

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Datum / *Date*
2001-03-09

Beteckning / *Reference*
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Rev 1

Airflow of AirFree

Items tested

Air cleaner AirFree, 230 V, 50 Hz, 400 mA, 46 W, Serial # 53002309. The item arrived to SP on Febuary 27, 2001 in good condition. The air cleaner was on for nine days before testing. The test results apply only for the item tested.

Place and date of testing

The test of airflow was carried out at SP's Energy Technology / HVAC laboratory in Borås on Mars 9, 2001.

Test procedure

The air cleaner was placed on the floor. A tube (paper) was mounted after the exhaust in purpose to get a nice flow pattern. This might affect the airflow but probably to an insignificant extent. The outlet (measuring plane) was divided into five areas in which the air velocity was measured in four points (except the middle which was measured in only one point). The air velocity at the testing place was zero without the test item present.

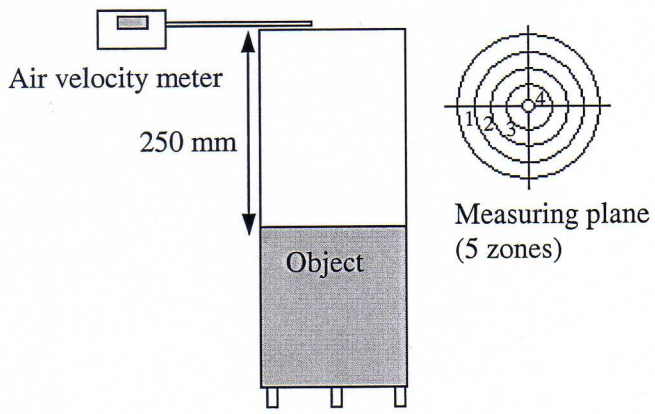

Figure 1. Test set up.

Results

From the air velocity in each zone the airflow was calculated by using each zones area.

	Centre	Zon 4	Zone 3	Zone 2	Zone 1
Air velovity (cm/s)	16	17	14	13	12

Table 1. Air velocity

The total airflow of the air cleaner is 14 m³/h.

Measurement equipment

Air velocity meter (Anemometer) Alnor Compuflow GGA-65P
(SP's inventory no. 202 259)

Estimated uncertainties of measurement

Airflow ± 15 %

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