August 2015-Internal Report for Antimic Coated Airfilter media against to Legionella

1) **Antimic® coated Air filter media activity results:**

We've test antimicrobial activity of Antimic® coated air filters against to, LEGIONELLA PNEUMOPHILA, by using three different test methods like; AATCC 147-2004-Parallel Streak Method, EN ISO 20645:2004-Agar Diffusion Plate Test and AATCC 100–2004 Test Method. All tests show high activity and can be recommended to coat air filters by using aerosol spray product.

Moreover same Antimic® coated filter material activity tested against common pathogen bacteria like; Staphylococcus aureus, Klebsiella pneumonia, Escherichia coli by using AATCC 100 test (Assessment Of Antibacterial Finishes On Textile Materials).

Summary of test results are enclosed;

Activity test against *Legionella Pneumophila* by using AATCC 100–2004 Test Method (Assessment Of Antibacterial Finishes On Textile Materials)

Sample	Control # of bacteria	At the end of exposure, # of bacteria	% deactivation
Polyester Fiber (*L. pneumophila* bakterisi ile initial exposure)	$4.75x10^5$	$5.33x10^4$	88.76
Polyester Fiber (*L. pneumophila* bakterisi ile 1 Hour exposure)	$4.75x10^5$	<100	> 99.978
Polyester Fiber (*L. pneumophila* bakterisi ile 24 Hours exposure)	$4.75x10^5$	<100	> 99.978
Glass Fiber (*L. pneumophila* bakterisi ile initial exposure)	$5.25x10^5$	$6.85x10^4$	86.94
Glass Fiber (*L. pneumophila* bakterisi ile 1 Hour exposure)	$5.25x10^5$	<100	>99.98
Glass Fiber (*L. pneumophila* bakterisi ile 24 Hours exposure)	$5.25x10^5$	<100	>99.98

Activity test against *Staphylococcus aureus, Klebsiella pneumonia, Escherichia coli* by using AATCC 100–2004 Test Method (Assessment Of Antibacterial Finishes On Textile Materials)

Sample	Control # of bacteria	At the end of exposure, # of bacteria	% deactivation
Polyester (*S. aureus,* 0 initial exposure)	3.77×10^5	1.45×10^5	61.53
Polyester (*S. aureus,* 1 Hour exposure)	3.77×10^5	<100	>99.973
Polyester (*S. aureus,* 24 Hours exposure)	3.77×10^5	<100	>99.973
Cam Elyaf (*S. aureus,* 0 initial exposure)	1.33×10^6	<100	>99.992
Cam Elyaf (*S. aureus,* 1 Hour exposure)	1.33×10^6	<100	>99.992
Cam Elyaf (*S. aureus,* 24 Hours exposure)	1.33×10^6	<100	>99.992

Sample	Control # of bacteria	At the end of exposure, # of bacteria	% deactivation
Polyester (*K. pneumonia*, 0 initial exposure)	2.23×10^7	9.3×10^6	15.06
Polyester (*K. pneumonia*, 1 Hour exposure)	2.23×10^7	<100	>99.999
Polyester (*K. pneumonia*, 24 Hours exposure)	$2.23 < x 10^7$	<100	> 99.999
Cam Elyaf (*K. pneumonia*, 0 initial exposure)	1.16×10^7	2.65×10^5	97.71
Cam Elyaf (*K. pneumonia*, 1 Hour exposure)	1.16×10^7	<100	>99.999
Cam Elyaf (*K. pneumonia*, 24 Hours exposure)	1.16×10^7	<100	>99.999

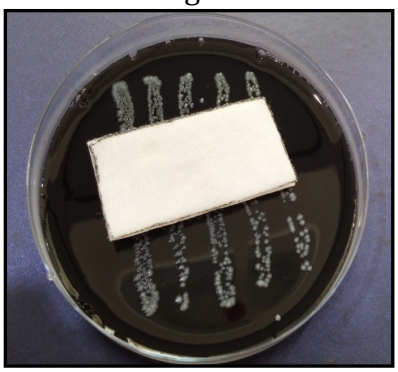
Sample	Control # of bacteria	At the end of exposure, # of bacteria	% deactivation
Polyester (*E. coli*, 0 initial exposure)	2.79×10^7	2.70×10^7	3.04
Polyester (*E. coli*, 1 Hour exposure)	2.79×10^7	<100	>99.999
Polyester (*E. coli*, 24 Hours exposure)	2.79×10^7	<100	>99.999
Cam Elyaf (*E. coli*, 0 initial exposure)	3.06×10^7	<100	>99.999
Cam Elyaf (*E. coli*, 1 Hour exposure)	3.06×10^7	<100	>99.999
Cam Elyaf (*E. coli*, 24 Hours exposure)	3.06×10^7	<100	>99.999

AATCC TEST METHOD 147-(PARALLEL STREAK METHOD)

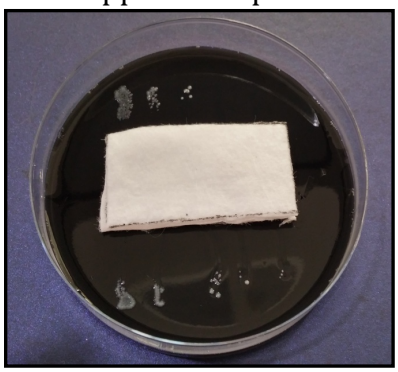
A- POLYESTER Fiber Filter Results *L. pneumophila* ATCC 33152

Sample	T/mm	D/mm	T-D/mm	(T-D/2) mm	Average W/mm	Microbial Growth
1	42	25	17	8,5	11,10	None
	47	25	22	11,0		None
	48	25	23	11,5		None
	49	25	24	12		None
	50	25	25	12,5		None
2	45	25	20	10,0	12,50	None
	47	25	22	11,0		None
	47	25	22	11,0		None
	55	25	30	15,0		None
	56	25	31	15,5		None
3	41	25	16	8,0	9,20	None
	41	25	16	8,0		None
	45	25	20	10,0		None
	45	25	20	10,0		None
	45	25	20	10,0		None

No Microbial growth was observed under Antimic applied sample



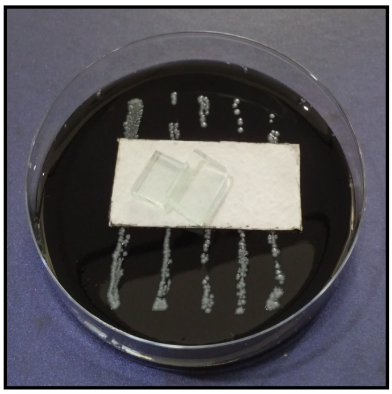
Control



Antimic applied media

B- Glass Fiber Filter Results, *L. pneumophila* ATCC 33152

Weak microbial growth was observed under Antimic applied sample-may need to increase active material



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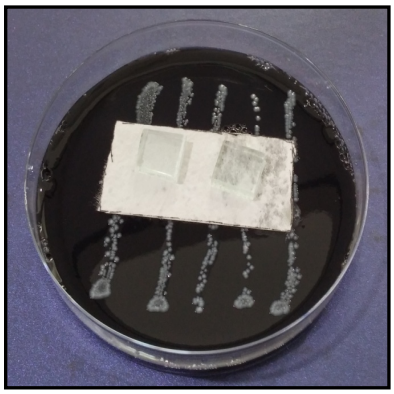


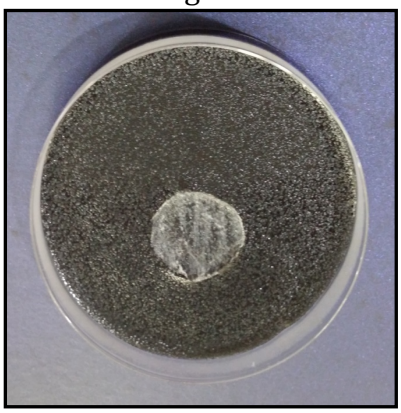
Antimic applied media

EN ISO 20645:2004 (DETERMINATION OF ANTIBACTERIAL ACTIVITY-AGAR DIFFUSION PLATE TEST)

A- POLYESTER Fiber Filter Results *L. pneumophila* ATCC 33152

Sample	D/ mm	d/mm	D-d/ mm	(D-d/2)= H mm	Microbial Growth
1	31,75	25	6,75	3,375	None
2	30,50	25	5,5	2,75	None
3	32	25	7,0	3,5	None

No Microbial growth was observed under Antimic applied sample



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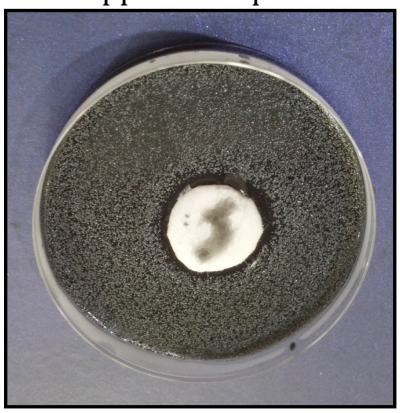
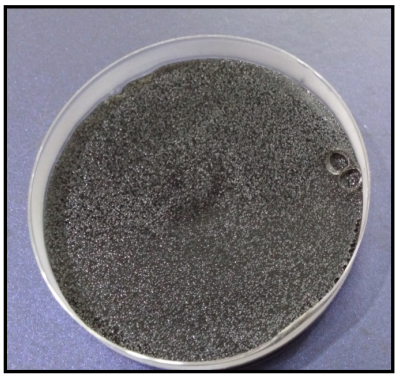


Antimic applied media

B- Glass Fiber Filter Results, *L. pneumophila* ATCC 33152

Sample	D/ mm	d/mm	D-d/ mm	(D-d/2)= H mm	Microbial Growth Under sample?
1	-	25	-	-	Weak
2	-	25	-	-	Weak
3	-	25	-	-	weak

Weak microbial growth was observed under Antimic applied sample-may need to increase active material



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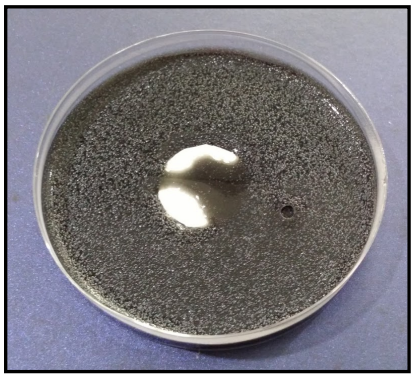

Antimic applied media

2) Antimic® active materials activity test results (minimum inhibitory concentration):

Minimum inhibitory concentrations of Antimic® active materials against following micro organisms by using turbidity standard was used to dilute the Mueller Hinton Broth stock of the microbes to the correct dilution of $1x10^8$ CFU/ml

- *Staphylococcus aureus* ATCC 6538 — 32 µg/ml
- *Candida albicans* ATCC 10231 — 16 µg/ml
- *Pseudomonas aeruginosa* ATCC 15442 — 8 µg/ml
- *Enterecoccus hirae* ATCC 10541 — 8 µg/ml
- *Escherichia coli* ATCC 10536 — 8 µg/ml
- *Enteroccoccus faecium* ATCC 6057 — 8 µg/ml
- *Legionella Pneumophila* ATCC 33152 — 10-60 µg/ml
- *Aspergillus brasiliensis* — 60 µg/ml

Some more tests are on the way and I'll share w you.

Please find some useful toxicity information reported by EPA-USA

Appendix A Toxicology Profile

Acute Toxicity for Product Labeling

As listed in Table 9, acute toxicity data for a 50% formulation of 3-(trimethoxysilyl) propyl dimethyl octadecyl ammonium chloride show low acute toxicity for single exposures by the oral, dermal, and inhalation routes (Categories IV, III, and IV respectively). However, severe acute toxicity is observed with respect to skin and eye irritation of this active ingredient.

Table 9 - Acute Toxicity Studies for Trimethoxysilyl QACs

Guideline No./ Study Type	MRID No.	Results	Toxicity Category
870.1100 (81-1)	40385201	Oral LD_{50} > 5000 mg/kg	IV
870.1200 (81-2)	40385201	Dermal LD_{50} > 2000 mg/kg	III
870.1300 (81-3)	Not Available	Inhalation LC_{50} > 2.0 mg/L (1 Hour)	IV
870.2400 (81-4)	403385201	Severe irritant to ocular tissue	I
870.2500 (81-5)	Not Available	Severe irritant to skin	I
870.3250	41339403	Dermal and Systemic NOAEL > 1000 mg/kg/day	Acceptable
870.3100	46280411	NOAEL ≥ 240 mg/kg/day (HDT)	Acceptable
870.3700	41438003	Maternal and Developmental NOAEL ≥ 1000 mg/kg/day	Acceptable
870.5100	46280412	No evidence of mutagenicity	Acceptable
870.5300	46280413	No evidence of mutagenicity	Acceptable
870.5375	46280414	No association with the induction of structural chromosomal aberration	Acceptable
	41296803	No evidence of compound inducted cytotoxicity	Acceptable