Allergena

Test of Blueair aircleaner; model 402 equipped with a particle filter

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Summary

The Blueair range of air-cleaners is based on a combination of mechanical and active electrostatic filtration of particles in the air. This air-cleaner is based on model 402 with a polypropylene filter unit. The aim of this study was to test the efficiency of this filter system in reducing airborne pathogens in indoor air.

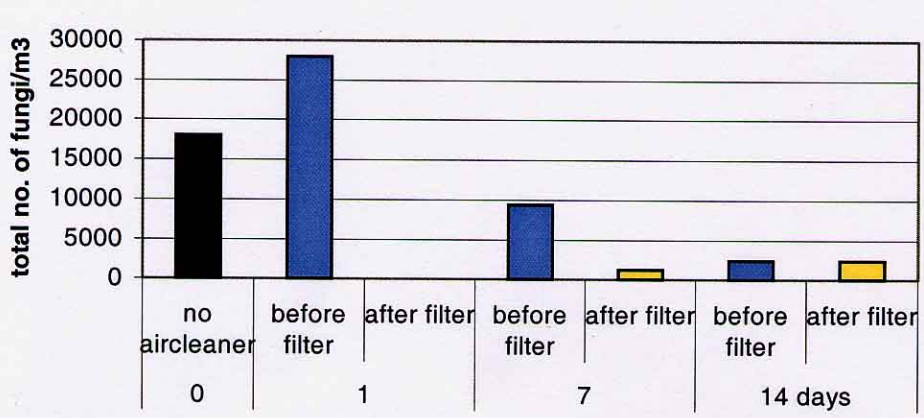
The test was performed in a room in a pre-school with sick-building syndrome (SBS) caused by dampness and microbial growth in floors, walls and beams. The air contained a relatively low total number of microbial particles (40,000 microorganisms per cubic meter of air), which can be regarded as good quality indoor air, but the composition of airborne pathogens reduced the quality of the air. The most common pathogen was the bacteria *Streptomyces* (42 %) that belongs to a group that gives rise to respiratory problems. The most common fungi present in the air were *Aspergillus* species, which are very common in indoor environments, *Eurotium,* which can grow under relatively dry conditions, and *Cladosporium,* a mould that is common on damp wood-material. *Cladosporium* can form spores that are easily airborne, causing allergic reactions in sensitive people. Furthermore, the colony forming units (cfu) were high, the viable number of fungi was about 65 %, which indicated a source of microbial growth in the building.

The Blueair air-cleaner was running during two weeks in the test room. Air sampling was performed before start (no air-cleaner), during the first day (1), after seven days (7) and after 14 days (14) of running the air-cleaner. Sampling was performed with pumps equipped with a special filter for collection of microorganisms. The air-samples were analyzed for total number and cfu (viable no.) of bacteria and fungi as a measure of the efficiency of the air-cleaner.

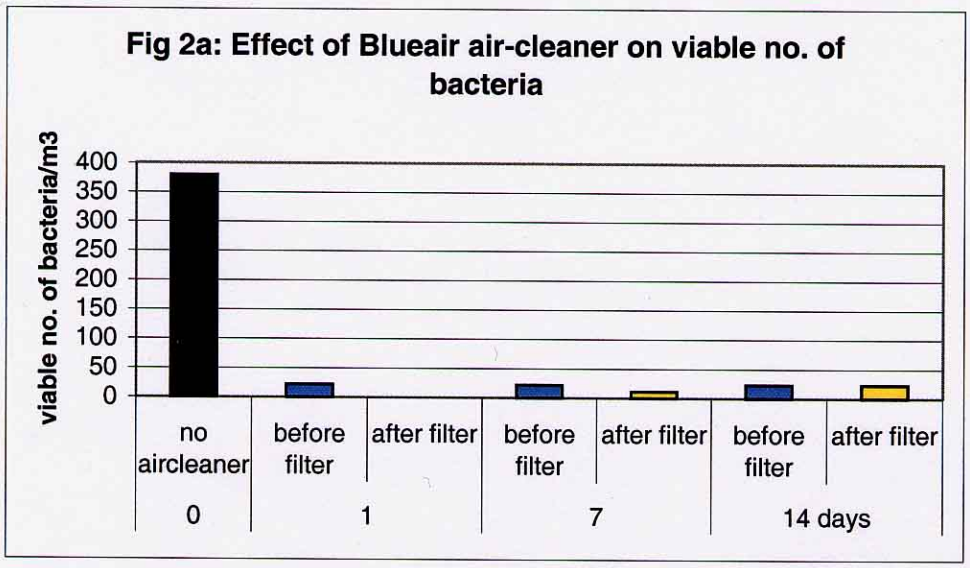
Figures 1a and 1b show the results from the tests for bacteria and fungi, respectively. The first bar (black) in each diagram represents the level of total microbes present in the air before starting the air-cleaner. The second, fourth and sixth bars represent total number of microbes, present in the incoming air (before the filter) after 1, 7 and 14 days, respectively. The third, fifth and seventh bars represent the same values for air exiting from the air-cleaner. The results showed that Blueair air-cleaner had an exclusion level of 45 % (range 33-55 %) for total number of bacteria and 45 % (range 0-87 %) for total number of fungi, calculated as the difference in total number of bacteria and fungi measured before and after the air-cleaner. The diversity of microbial species in air samples taken before and after the air-cleaner was approximately the same, indicating that the filter was relatively generic in its function.

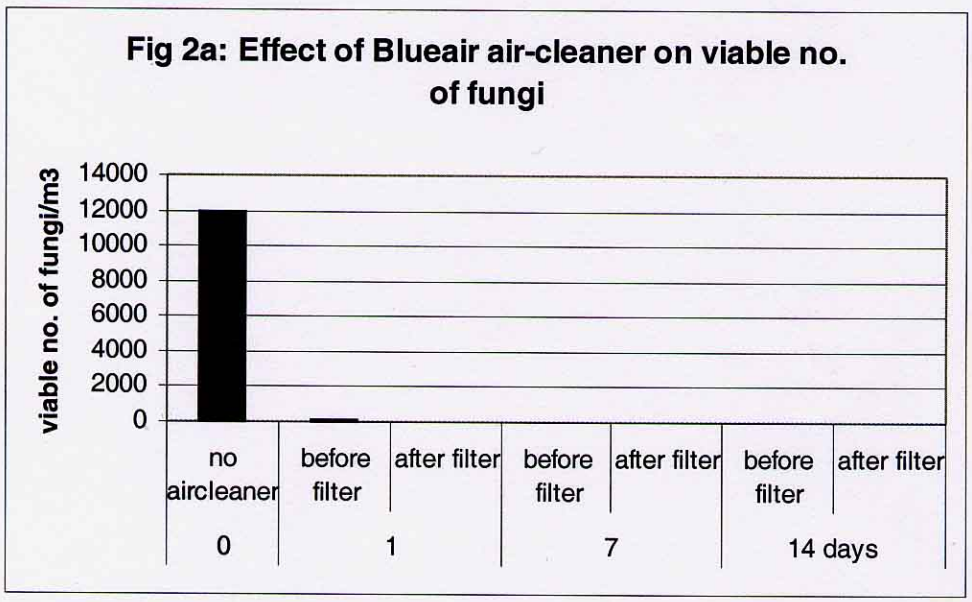
Fig 1a: Effect of Blueair air-cleaner on total no. of bacteria

Fig 1b: Effect of Blueair air-cleaner on total no. of fungi



Figures 2a and 2b show the results for viable microbes, in a fashion similar to figures 1a and 1b. In figure 2 the efficiency of Blueair air-cleaner in reducing the number of growth-forming microbes (cfu) was 94% for viable bacteria (fig 2a) and 99% for viable fungi (fig 2b).



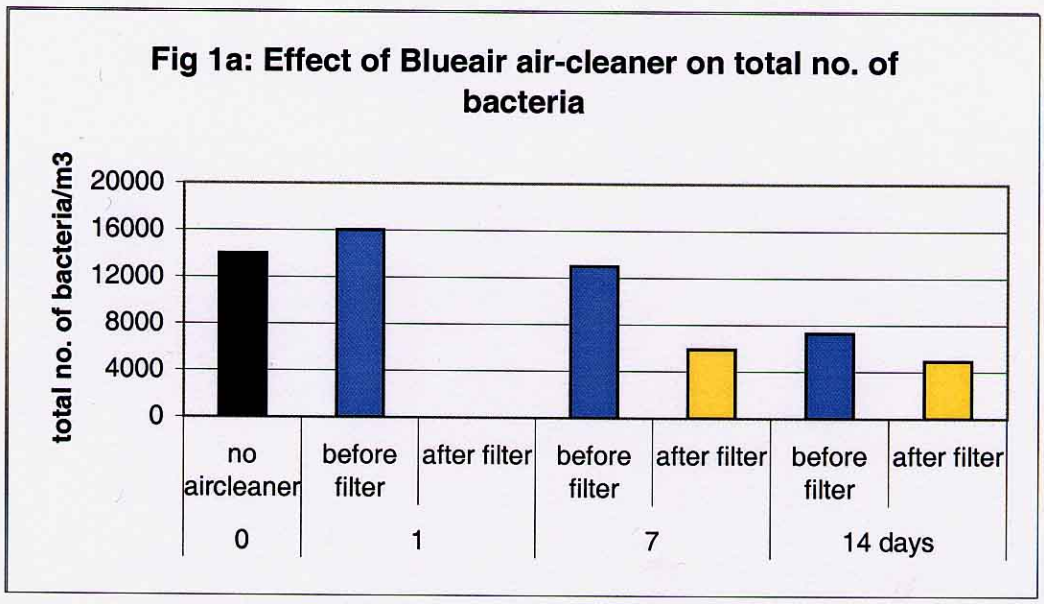


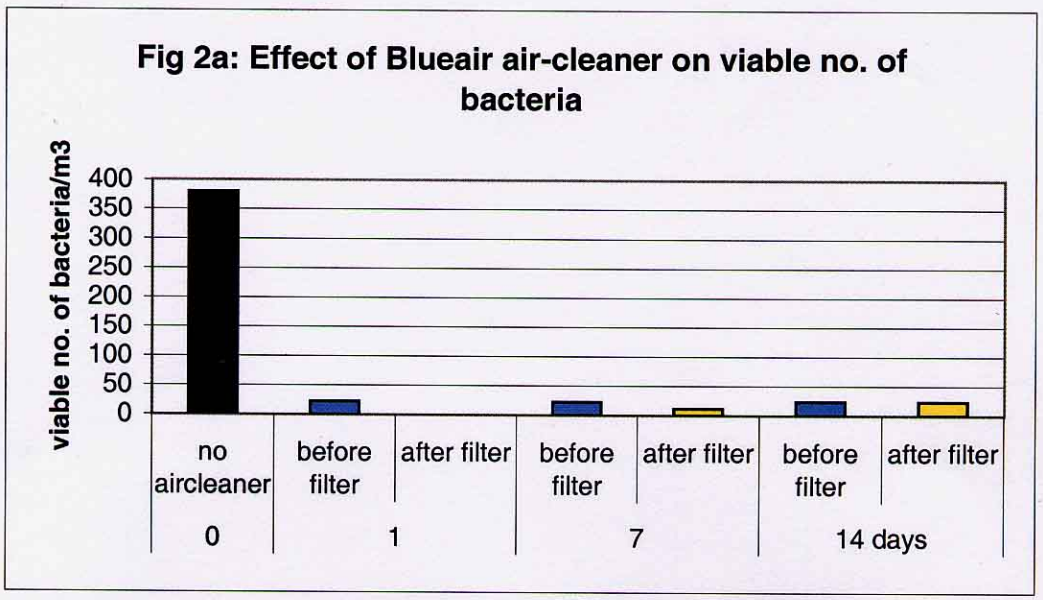
Conclusions:

The Blueair air-cleaner, model 402 with polypropylene filter unit, reduced the number of airborne viable (cfu) bacteria and molds by 94% and 99%, respectively. The separation level of total number of bacteria and fungi was about 45% in a room with moisture damage and ongoing growth of microbes.

Test of Blueair air-cleaner

Day	Filter	Bacteria total no.			viable no.	%	
0	no aircleaner	14000	100%		380	2	100%
1	before filter	16000	114%	100	22	0	6%
	after filter						
7	before filter	13000	93%	100%	22	0	6%
	after filter	5900	42%	45%	11	ej appl	
14 days	before filter	7300	52%	100%	23		6%
	after filter	4900	35%	67%	23		





Fungi total no.			viable no.	%		
18000	100%		12000	65	100%	
28000	155%	100%	160	0	1.3%	
9400	52%	100%	34	0	0.3%	
1200	7%	13%	11	ej appl	0.1	
2400	13%	100%	23		0.2%	
2400	13%	100%	23		0.2%	

Fig 1b: Effect of Blueair air-cleaner on total no. of fungi

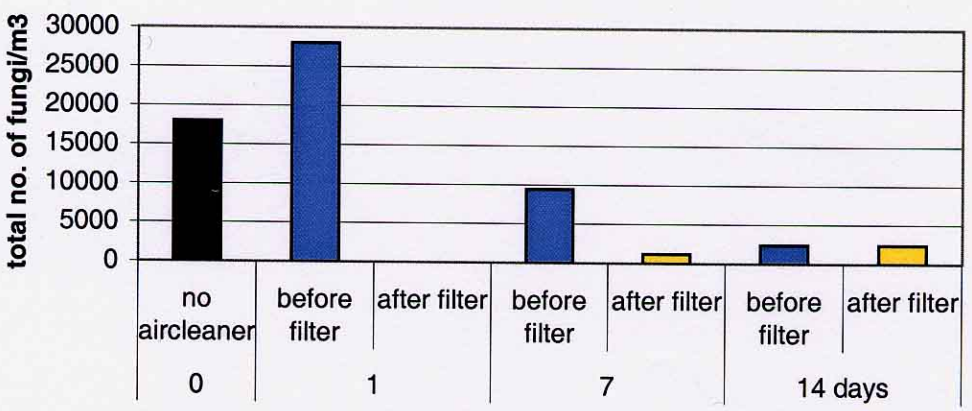


Fig 2a: Effect of Blueair air-cleaner on viable no. of fungi