

Comparison of vacuum cleaners

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• AMONG INDOOR allergens, house dust mites (HDM) allergens are usually not detected airborne in undisturbed conditions, but cat allergens can remain airborne for long periods of time (1,2).

The act of vacuum cleaning can increase the dispersion of particles, depending on the efficiency of the filtration devices (3).

In this pilot study we aimed to compare the efficiency of three vacuum cleaners (VCs) with particular regard to mite (Der p 1) and cat (Fel d 1) allergens.

VC1 was provided with water and a washable polyethylene (PE) filter (Acarbuster 2000, Envicon, Italy), VC2

with water and a high efficiency particulate air (HEPA) filter (Aida Live, Tecnovap srl, Italy), and VC3 was a conventional vacuum cleaner with a double-thickness paper bag, without exhaust filter.

Air sampling was performed in a clean experimental room of 15 m³ volume by a Cascade Impactor Vortex Ultra (Casella Ltd, Bedford, UK), operating at a mean flow rate of 16.5 l/min, with a final glass-fiber filter type AP20 (Millipore, Bedford, MA).

Samples of median weight 18 g containing a median concentration of Fel d 1 of 9000 µg and Der p 1 of 198 µg were collected by the different VCs operating for 15 min.

Fel d 1 and Der p 1 levels were quantified by enzyme-linked immunosorbent assay (ELISA) (Indoor Biotechnologies, Chester, UK) (4). The amount of airborne Der p 1 and Fel d 1 recovered by Vortex filter are shown in Fig. 1.

VC1 and VC2 showed lower allergen leakage than VC3, even in absence of the PE or HEPA filter. VC1 and VC2 demonstrated a markedly higher efficiency when equipped with PE or HEPA filters.

PE and HEPA filters were comparable in terms of Fel d 1 and Der p 1 trapping.

One main advantage of PE filters is that they can be washed in water, and do not need to be replaced as often as HEPA filters. Therefore, we suggest that PE filters in VCs could be a valid alternative to HEPA filters for controlling airborne dispersion of indoor allergens.

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Polyethylene filters could effectively trap allergens.

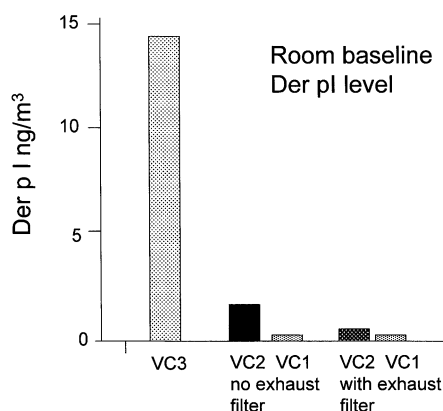


Figure 1. Airborne levels of (A) Fel d 1 and (B) of Der p 1 after using three different vacuum cleaners.