



Variability introduced into allergen immunoassays during the dust extraction process

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RATIONALE

Allergen exposure assessments are routinely based on reservoir dust samples. Specimens are sieved, weighed and extracted prior to their use in immunoassays.

While standard protocols state that 100mg of fine dust should be extracted, this is not always feasible. Furthermore, residential dust is not necessarily a homogeneous material.

The aim of this study was to determine the effect of extracted dust weights on allergen exposure results and variability in immunoassays.

METHODS

Five residential bulk dust samples were sieved and used in this study. Triplicate dust weights of 2mg, 10mg, 25mg, 50mg, 100mg, 200mg, 500mg and 1000mg were weighed from each dust sample by the same technician. Extracts were prepared of each aliquot at 50mg dust/ml. All 120 samples were analyzed for Der p 1, Der f 1, Fel d 1 and Can f 1 using MARIA (Multiplex Array for Indoor Allergens). Variability between triplicates was determined using Mean, StDev and CV%.

RESULTS

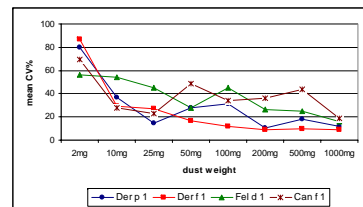
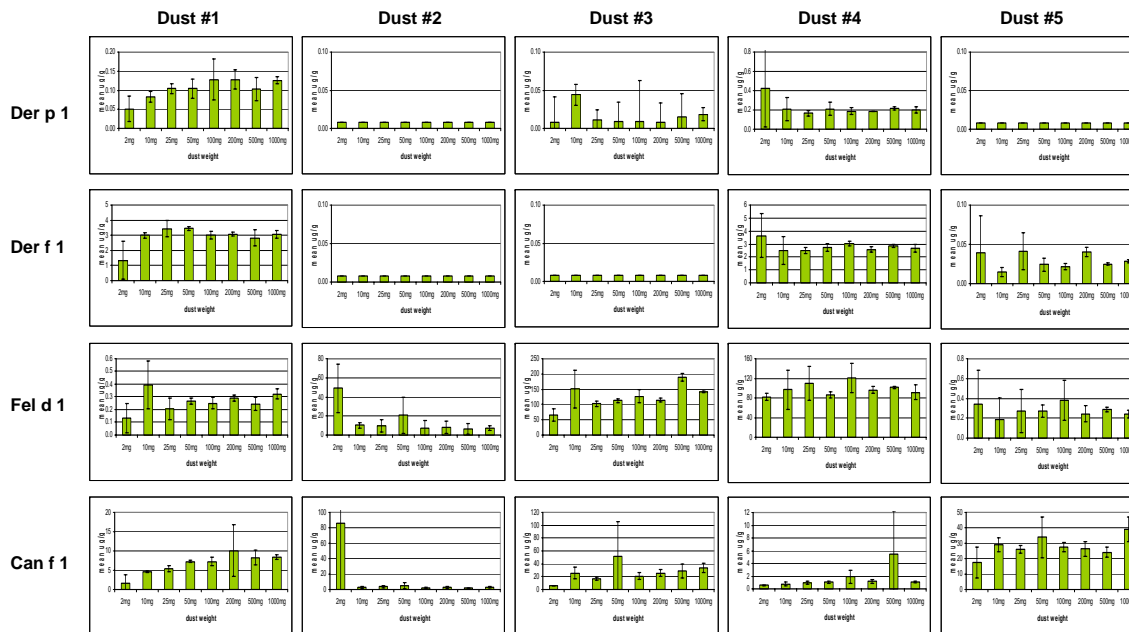


Figure 1: Variability between triplicate aliquots by dust weight (mean CV% between dust samples >LOD)

RESULTS cont.

- Analyses of triplicate dust aliquots showed some variability for all dust weights and for all measured allergens.
- Highest levels of variability were observed for the 2mg dust aliquots.
- Dust mite allergen results appeared to be more consistent than cat and dog allergen results.

Figure 2: Mean allergen results (µg/g) and Standard Deviations of triplicate dust aliquots by dust weight



CONCLUSIONS

- While dust weights of 2mg did not yield reliable results, using 10mg or more of fine dust improved reproducibility.
- Results indicate that allergen-bearing particles in residential dust may be more evenly distributed for dust mite than for cat and dog.
- Our data suggest that a minimum of 10mg fine dust should be used for allergen analysis.