

Validation of the Recovery of House Dust Mites from Fabrics by Means of Vacuum Sampling

Authors : A. Aljohani, D. Burke, D. Clarke, M. Gormally, M. Byrne, G. Fleming

Abstract : Introduction: House Dust Mites (HDMs) are a source of allergen particles embedded in textiles and furnishings. Vacuum sampling is commonly used to recover and determine the abundance of HDMs but the efficiency of this method is less than standardized. Here, the efficiency of recovery of HDMs was evaluated from home-associated textiles using vacuum sampling protocols. Methods/Approach: Living Mites (LMs) or dead Mites (DMs) House Dust Mites (*Dermatophagoides pteronyssinus*: FERA, UK) were separately seeded onto the surfaces of Smooth Cotton, Denim and Fleece (25 mites/10x10cm² squares) and left for 10 minutes before vacuuming. Fabrics were vacuumed (SKC Flite 2 pump) at a flow rate of 14 L/min for 60, 90 or 120 seconds and the number of mites retained by the filter (0.4µm x 37mm) unit was determined. Vacuuming was carried out in a linear direction (Protocol 1) or in a multidirectional pattern (Protocol 2). Additional fabrics with LMs were also frozen and then thawed, thereby euthanizing live mites (now termed EMs). Results/Findings: While there was significantly greater (p=0.000) recovery of mites (76% greater) in fabrics seeded with DMs than LMs irrespective of vacuuming protocol or fabric type, the efficiency of recovery of DMs (72%-76%) did not vary significantly between fabrics. For fabrics containing EMs, recovery was greatest for Smooth Cotton and Denim (65-73% recovered) and least for Fleece (15% recovered). There was no significant difference (p=0.99) between the recovery of mites across all three mite categories from Smooth Cotton and Denim but significantly fewer (p=0.000) mites were recovered from Fleece. Scanning Electron Microscopy images of HMD-seeded fabrics showed that live mites burrowed deeply into the Fleece weave which reduced their efficiency of recovery by vacuuming. Research Implications: Results presented here have implications for the recovery of HDMs by vacuuming and the choice of fabric to ameliorate HDM-dust sensitization.

Keywords : allergy, asthma, dead, fabric, fleece, live mites, sampling

Conference Title : ICISE 2021 : International Conference on Insect Science and Entomology

Conference Location : Helsinki, Finland

Conference Dates : July 19-20, 2021