Mite penetration of different types of material claimed as mite proof by the Siriraj chamber method

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Background: There are different materials and principles used in the construction of bed encasings. Although these covers claim to have antimite properties, they might not be mite proof.
Objective: This study evaluated the effectiveness of mite penetration of these covers by using the Siriraj chamber method.
Methods: Thirty-two covers collected from 9 different countries were categorized according to the materials used to manufacture them. They were (1) tightly woven, (2) film or membrane coated and loosely woven, (3) acaricidal coated and loosely woven, (4) nonwoven, (5) film coated and nonwoven, (6) acaricidal coated and nonwoven, and (7) plastic. Adult mites, *Dermatophagoides pteronyssinus*, were placed on either the outer or inner surfaces of each of the test fabrics for 3 replications, resulting in a total of 6 samples per fabric. All samples were observed for penetration every day for 1 week under a stereomicroscope. If a single mite penetrated any fabric, it was scored as a penetration.
Results: Mites penetrated (1) into all samples of film-coated woven and nonwoven covers, an acaricide-coated nonwoven cover, and nonwoven types; (2) from both sides and colonized within the matrix of some samples; and (3) completely in other cases. All of the woven covers and the plastic cover prevented mite penetration. Photomicrographs documented all penetrations.
Conclusions: Tightly woven covers and plastic prevent mite penetration, whereas nonwoven, loosely woven, acaricide-coated, and laminated materials do not. The Siriraj chamber method adequately evaluates the effectiveness of antimite barriers.
Clinical implications: For mite avoidance, allergists should recommend the use of tightly woven covers on suspected bedding containing dust mites. (J Allergy Clin Immunol 2006;118:1164-8.)

Key words: *Mite-proof covers, antimite covers, encasement of beddings*

The use of encasings on bedding is widely advocated by both asthma management guidelines and by allergists to reduce exposure in beds to the allergens produced by house dust mites (*Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*).[1-4] Such encasings form a physical barrier around items of bedding, which prevents the movement of mites between different parts of the bed, thus limiting colonization. They also prevent the allergens from these encased reservoirs from becoming airborne, thereby reducing allergen exposure. Although regular laundry can additionally be used to remove allergens and, to some extent, mites from washable items of bedding,[5] the washing of mattress encasings is seldom feasible because they are too cumbersome to regularly remove, launder, and refit. At best, encasings can be wiped down, and this is suggested in some instructions to users.

The strong global advocacy of encasings has led to the development of many different types of encasings around the world. These differ widely in the type of materials used for their construction, which in turn affects their permeability to allergens and humidity. However, there are no guidelines as to the desirable properties for such encasings and few studies of their different performances. One of the few comparative studies showed that a fabric pore size of 10 μm was sufficient to prevent the passage of mite allergens under the conditions of testing by using a modified Fussnecker chamber, whereas a pore size of 2 μm was required to prevent the passage of the smaller particles carrying cat allergens.[6,7] Several other studies have shown large differences in the permeability of different types of encasings to water vapor, which probably affects their comfort when used.[8,9] At this time, the ideal characteristics for encasings were low passage of allergens and high passage of water vapor.

Three years ago, Mahakittikun et al[10,11] showed that there was another distinguishing and potentially important feature of encasings. This was that some encasings supported the colonization of live mites within the nonwoven

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