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Effect of allergen-impermeable covers on ß-(1,3)-glucan content of pillows

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Key words: asthma; ß-(1,3)-glucan; impermeable covers; pillows.

Pillows are a known source of house dust mite (HDM) allergens and covering pillows with allergen-impermeable covers is known to reduce exposure to HDM allergens (1). House dust mite sensitized patients are often advised to cover all bedding items with allergen-impermeable covers and, although some studies have shown beneficial effects, other studies have not. Lately, it has been shown that pillows contain substantial amounts of fungi (2) which may be of importance for asthmatic patients. Subsequently we demonstrated that pillows contain appreciable amounts of ß-(1,3)-glucan, a major component of the fungal cell wall (3). Although ß-(1,3)-glucan is nonallergenic, it is pro-inflammatory and shows associations with airway inflammation and asthma symptoms (4). Early exposure in infancy to ß-(1,3)-glucan may also protect against development of allergic diseases in childhood (5). To our knowledge, no studies have determined the effects of impermeable covers on ß-(1,3)-glucan levels.

Allergen-impermeable covers reduces total ß-(1,3)-glucan load on pillows.

Ten pillows, which had been on five mattresses for at least 3 months, were studied. Initially, dust was collected from the top of the pillows by vacuuming each side for 1 min. The pillows were then covered with impermeable covers (Premium Microfiber Encasings, Mission:Allergy, Hawleyville, CT, USA) and replaced on the mattresses. After 6 weeks, dust was again collected from the top of the pillows.

Collected dust samples were weighed and extracted with 0.3 M NaOH. The ß-(1,3)-glucan content of the supernatants were determined by a modified *Limulus* amoebocyte lysate kinetic assay kit specific for ß-(1,3)-glucan (Glucatell; Cape Cod Inc., Falmouth, MA, USA). Because of non-normal distribution, ß-(1,3)-glucan results were log-transformed and results expressed as geometric means (total ng/pillow) with 95% confidence intervals (95% CI). The effect of allergen-impermeable covers on ß-(1,3)-glucan levels was assessed by paired Student's *t*-test and a P value of < 0.05 was deemed statistically significant.

After 6 weeks of allergen-impermeable covers, pillows ß-(1,3)-glucan content, expressed as ng/pillow, was significantly reduced by about three- to four-fold. This reduction was primarily because of a reduction in total dust weights recovered after 6 weeks as there was no difference when expressed as ng/g. Table 1 shows the ß-(1,3)-glucan levels and dust sample weights before and after 6 weeks of allergen-impermeable covers.

This study has shown that covering pillows with allergen-impermeable covers reduces total ß-(1,3)-glucan load by about three- to four-fold. This was predominantly because of about a three-fold reduction in total dust weight. We have previously shown that covering pillows with allergen-impermeable covers reduces dust permeability (6). It may be that by leaving the covers on for longer than 6 weeks that a greater reduction in ß-(1,3)-glucan may occur. Also, as we did not cover other bedding items, such as comforters and mattresses, greater reduction in ß-(1,3)-glucan can be anticipated as the ß-(1,3)-glucan content on pillows after 6 weeks of covering is most likely from the ß-(1,3)-glucan on the uncovered bedding items.

The reduction in ß-(1,3)-glucan after allergen-impermeable covers on pillows could be of clinical relevance for asthmatics as bedding is in close proximity to the airways and ß-(1,3)-glucan is both pro-inflammatory and has been shown to increase peak flow variability in children (5). Further studies are warranted to determine if covering all bedding items with allergen-impermeable covers, and for longer periods, significantly reduces exposure to ß-(1,3)-glucan and whether this reduction leads to an improvement in asthma symptoms.

Table 1. β-(1,3)-glucan levels and dust sample weights before and after allergen-impermeable covers

	Dust weight (mg)	Ratio*	ß-(1,3)-glucan (ng/pillow)	Ratio*	ß-(1,3)-glucan (ng/g)
Week 0	70.2 (37.2–103.2	2.94 (2.36–3.52)	41244 (18574–63914)	3.51 (2.30–4.72)	80023 (64113–95933)
Week 6	22.0 (13.5–30.5)		14727 (12913–16541)		79269 (63179–95359)
P	0.0042		0.0030		0.97

*Ratio week 0 : week 6.

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Turnip and zucchini: new foods in the latex-fruit syndrome

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Key words: allergy; anaphylaxis; latex; turnip; zucchini.

Turnip and zucchini: new vegetables responsible for cross-reactivity between latex and plant-derived foods.

Since the first description of systemic reaction induced by plant-derived food in a patient allergic to latex (1), several reports of cross-reactivity between latex, fruits and vegetables had been described. In 1994, Blanco et al. (2) suggested the designation latex-fruit syndrome to describe this syndrome.

Turnip (*Brassica rapa*) belongs to the *Brassicaceae* family also called *Cruciferae*. This is known as the mustard or cabbage family. Turnip is a root vegetable commonly grown in temperate climates worldwide for its white, bulbous taproot.

Zucchini (*Cucurbita pepo*), also known has courgette, belongs to *Cucurbitaceae* family. It is a small summer marrow or squash, also commonly called Italian squash. Despite being a fruit, zucchini is considered to be a vegetable in culinary and is traditionally picked when very immature.

We report the case of a female patient, 42 years old, worker in the mineral extraction industry for several years, with significant exposure to rubber, describing multiple episodes of anaphylaxis. The first episode took place 30 min after ingestion of chestnut when she was 25 years old. After this, she reported other episodes after ingestion of almond nut, hazelnut, banana, kiwi, mango, avocado, fig and tomato and recently also with both raw and cooked zucchini and turnip. The symptoms always included oral allergy syndrome, urticaria, angioedema and glottis oedema. All the episodes needed medical attention in the Emergency Department. She also describes an anaphylaxis episode after blowing latex balloons. The only medical care with exposure to latex material was at 23 years old when she had normal delivery.

After the first observation in our Allergy Department (2005), it became clear a clinical history suggestive of latex–fruit syndrome.

The skin prick tests with commercial extracts to aeroallergens, latex (ALK Abelló, Madrid, Spain), fruits, nuts, vegetables and legumes (Leti, Madrid,

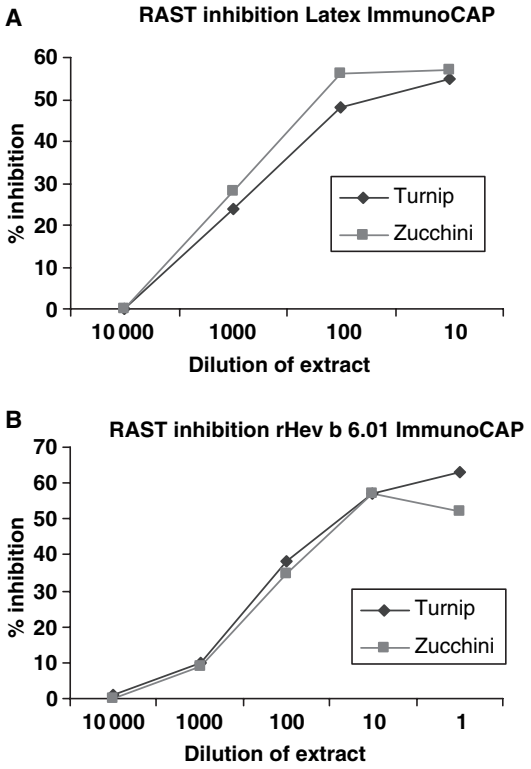

Figure 1. RAST inhibition with turnip and zucchini extracts. (A) RAST inhibition of latex ImmunoCAP. (B) RAST inhibition of rHev b6.01 ImmunoCAP.