

Short communication

Dust mite infestation of flour samples

Background: Ingestion of flour contaminated with dust mite may trigger severe anaphylaxis in tropical and sub-tropical regions.

Aims: This study aimed to evaluate environmental factors that affect dust mite propagation in the tropics.

Materials & Methods: Dust mites were introduced to a variety of flour samples and incubated at two different environmental conditions.

Results: It was found that dust mites populations flourished best in wheat flour compared to other varieties of flour, and at ambient temperatures with high humidity instead of the air conditioned environment.

Conclusion: Dust mite infestation of flour is dependent on the presence of wheat and high ambient temperature in the tropics.

F. C. Yi¹, J. Y. Chen¹, K. K. Chee¹,
K. Y. Chua¹, B. W. Lee²

¹Department of Paediatrics, National University of Singapore, Singapore; ²National University of Singapore – Paediatrics, Singapore

Key words: *Dermatophagoides farinae*; tropical climate; flour.

B. W. Lee
National University of Singapore – Paediatrics
5 Lower Kent Ridge Road
Singapore 119074
Singapore

Accepted for publication 6 January 2009

Severe anaphylaxis triggered by ingestion of dust mite in contaminated flour is a well described entity (1–6). It affects susceptible patients living especially in the tropical and subtropical regions, primarily because the high temperatures and humidity are highly conducive for dust mite propagation. The case series and single case reports thus far have involved ingestion of dust mites which have contaminated wheat flour samples, except for a single case report of mite contaminated corn flour (3). Since flour of many varieties is used in any cuisine, we set out to investigate whether flour samples of various sources promote dust mite proliferation equally, and to evaluate the environmental conditions conducive for their propagation in a tropical environment. To this end, samples of different types of flour (plain wheat flour, self-raising baking wheat flour, bread wheat flour, whole wheat meal flour, tempura batter mix containing wheat flour, glutinous rice flour, corn flour, tapioca flour, and sweet potato flour) were divided into duplicate aliquots of 10 g and placed in Ziploc plastic bags (25 × 20 cm). To these aliquots, 95 mites (based on triplicate counts using dissecting microscope) derived from a sample of 150 mg of dust mite (*Dermatophagoides farinae*) flour was added. This dust mite-contaminated flour sample was obtained from a patient who suffered anaphylaxis

after inadvertent ingestion of food cooked with this flour sample. The samples were then incubated in a household setting at room temperature (mean temperature 26.6°C, and mean relative humidity 88%) or in an air-conditioned environment (mean temperature 25.8°C, and mean relative humidity 54.9%) throughout the period of study. The samples were inspected at 2, 4 and 6 weeks postcontamination. For samples stored at room temperature, rapid growth of dust mites were observed in those containing wheat (plain wheat flour, self-raising wheat

Table 1. Mite counts in flour samples stored at room temperature over 6 weeks

Type of flour	Number of mites per gram of flour		
	Week 2	Week 4	Week 6
Plain flour	300	1750	3000–3500
Self-raising flour	450	1350	3000–3500
Bread flour	250	650	2500–3000
Whole meal flour	350	1250	3000–3500
Tempura batter mix	300	950	2500–3000
Glutinous rice flour	0	0	0
Corn flour	0	0	0
Tapioca flour	0	0	0
Sweet potato flour	0	50	0

plus baking flour, bread wheat flour, whole wheat meal flour, tempura batter mix containing wheat flour) (Table 1). In contrast, no dust mites were visualized in samples of glutinous rice flour, corn flour, tapioca flour, and sweet potato flour. For all samples stored in the air-conditioned environment, no mites were visualized throughout the 6 weeks of study. Our data therefore

suggest that contamination of flour with mites is dependent on the presence of wheat in the sample, and the environmental conditions conducive for mite growth are ambient temperatures above – in the tropics. This information will be useful for advising patients on precautions to be taken for storage of their flour samples for consumption purposes.

References

1. Blanco C, Quiralte J, Castillo R, Delgado J, Arteaga C, Barber D et al. Anaphylaxis after ingestion of wheat flour contaminated with mites. *J Allergy Clin Immunol* 1997;**99**:308–313.
2. Sanchez-Borges M, Capriles-Hulett A, Fernandez-Caldas E, Suarez-Chacon R, Caballero F, Castillo S et al. Mite-contaminated foods as a cause of anaphylaxis. *J Allergy Clin Immunol* 1997;**99**:738–743.
3. Guerra Bernd LA, Arruda LK, Barros Antunes HB. Oral anaphylaxis to mites. *Allergy* 2001;**56**:83–84.
4. Matsumoto T, Goto Y, Mike T. Anaphylaxis to mite-contaminated flour. *Allergy* 2001;**56**:247.
5. Matsumoto T, Satoh A. The occurrence of mite-containing wheat flour. *Pediatr Allergy Immunol* 2004;**15**:469–471.
6. Wen DC, Shyur SD, Ho CM, Chiang YC, Huang LH, Lin MT et al. Systemic anaphylaxis after the ingestion of pancake contaminated with the storage mite *Blomia freemani*. *Ann Allergy Asthma Immunol* 2005;**95**:612–614.