

Anaphylaxis to watermelon seeds

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To the Editor

Watermelon seeds have long been a delicacy in Asian dining, yet historically have been overlooked by western populations. Watermelon seeds contain a rich repertoire of nutrients such as proteins and unsaturated fatty acids, minerals, and carotenoids¹. Subsequently, there has been an increase in watermelon seed derivative products arising in the global market including North America, Europe, Asia Pacific, Latin America, Middle East, and Africa. Watermelon seeds are ingested in teas and snack products. Little is known about the potential allergenicity of watermelon seeds with no current published cases that we are aware of describing watermelon seed allergy. Here we report a patient found to have an IgE mediated anaphylactic reaction to watermelon seed paste.

A 2-year-old female with a past medical history of atopic dermatitis and food allergies to lentils, chickpea, egg, tree nut, shellfish, fish, macadamia, flaxseed, sesame seed and sunflower seed presented with a recent anaphylactic episode. Within minutes of eating less than a quarter teaspoon of a “Manuka Honey Plus Immunity Snack Pack”, she developed lip swelling and urticaria, for which she received an appropriate dose of cetirizine. However, the symptoms progressed to vomiting and concerns for a compromised airway developed due to gasping and excess drooling. Epinephrine was administered, with prompt resolution of symptoms.

The full list of ingredients in the Manuka Honey Plus Immunity snack pack were as follows: raw manuka honey, watermelon seed paste, prebiotic tapioca fiber, apple juice concentrate, elderberry juice concentrate, cranberry juice concentrate, chicory root fiber, acerola cherry extract and bee propolis extract. Complete review of the patient’s dietary intake prior to this reaction revealed regular and recent tolerance to manuka honey, flesh of watermelon fruit, and fruit juices with no reactions. Watermelon seed paste/butter had never been ingested previously. Skin prick testing (SPT) performed with the Manuka Honey plus immunity snack pack, and concentrated watermelon seed butter (containing organic watermelon seeds, organic powdered sugar, organic cane sugar, organic tapioca starch, organic expeller pressed sunflower oil, sea salt) were positive, with full results shown in Table 1. Additionally, given the nonexistence of standardized watermelon seed extract, skin testing with watermelon seed paste was performed on a control subject with no food allergies. The control demonstrated a positive histamine skin test and negative skin test to both saline and watermelon seed butter. Serum allergen-specific immunoglobulin E (sIgE) levels for honey, seeds (watermelon seed not commercially available) and venom (given the presence of bee honey) were tested, results shown in Table 2.

Overall, the positive skin test to watermelon seed butter and the honey nutrition pack, with the convincing history of an IgE mediated reaction, suggests that the patient reacted to concentrated watermelon seed. Although the presence of bee venom allergen in the honey in the snack pack cannot be excluded, negative IgE testing and previous tolerance of honey made this an unlikely culprit. As a result, we recommended strict avoidance of watermelon seed.

Watermelon (*Citrullus lanatus*) belongs to the Cucurbitaceae family which includes pumpkin/gourds, cucumber and melons. Within this family there has been documented cases of pumpkin seed hypersensitivity where patients were able to ingest the pumpkin flesh however reacted to seed ingestion.^{2, 3} Similarly in this case the patient was able to tolerate watermelon flesh but not the seed. Thus far, there have been no published reports characterizing watermelon seed allergens or confirmed protein homologies to other seeds or nuts. Of note several months after the watermelon seed reaction, our patient reported an anaphylactic reaction after a first-time ingestion of raw pumpkin seeds. Skin testing confirmed allergy to pumpkin seed. Thus, clinicians should be aware of possible cross-reactivity among plant seeds in the family and provide anticipatory guidance regarding avoidance.

In summary, we present a novel food allergy with anaphylaxis to watermelon seed. Limitations include non-standardized skin testing of watermelon seed, lack of commercially available serum allergen specific IgE test for watermelon seed, and the lack of oral food challenge to confirm the allergy. The high risk of severe reaction to watermelon paste based on history of the initial ingestion outweighed the benefit of a confirmatory oral food challenge. Although one of the limitations was lack of availability of standardized skin testing with watermelon seed, the lack of a localized IgE mediated reaction to the skin test using watermelon seed in the control subject gives additional confidence on the interpretation of the positive testing seen in the case. Future studies should include further characterization of major allergens within watermelon seed. This case demonstrates the importance of increased allergist awareness of watermelon seed allergy as more products enter the market.

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Table 1: Skin Test results

Skin Test	Skin Test Result (mm)
Post reaction to watermelon seed	Post reaction to watermelon seed
Saline	0/0
Histamine	5/0
Manuka Honey Plus Immunity Snack Pack	5/0
Roasted Watermelon Seed Butter	6/0

Table 1: Skin test results (wheal/flare) positive for the Roasted Watermelon Seed Butter and Manuka Honey Plus Immunity Snack Pack

Allergens	Serum Allergen-Specific IgE(Class V kU/L)
Honey	0.26
Honey Bee	< 0.1
Bumble Bee	< 0.1
Sesame Seed	64.7
Poppy Seed	7.81
Flaxseed Seed	9.46
Sunflower Seed	2.43

Allergens	Serum Allergen-Specific IgE(Class V kU/L)
Mustard Seed	9.15

Table 2. Specific IgE for allergens tested in patient. The patient demonstrates evidence for sensitization to multiple seeds and minimal allergen response to bee protein or honey.

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