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Title:

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Date:

2020-11-01

Citation:

Monda, S. & Nixon, R. (2020). Contact urticaria caused by occupational exposure to green beans. *Australasian Journal of Dermatology*, 61 (4), pp.372-373. <https://doi.org/10.1111/ajd.13334>.

Persistent Link:

<https://hdl.handle.net/11343/275772>

Contact urticaria caused by occupational exposure to green beans

Running title: Contact urticaria caused by green beans

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Word count: 1256

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/AJD.13334](#)

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Article type : Brief Reports

Case Letter to the Editor

A 27-year-old atopic male chef described an immediate cutaneous reaction to green beans, experiencing pruritus and erythema after skin contact. He also experienced itching of his throat and inner ears after ingestion of green beans. He previously experienced reactions to latex and symptoms after ingesting kiwi fruit and some seafood, and had a long history of hand and perioral dermatitis.

He was patch tested to the Australian Baseline Series, rubber series and various ingredients of skin care products, which did not yield any significant results. Skin prick testing to his foodstuffs produced a significant positive reaction to green beans. IgE was mildly raised at 120 UI/ml (normal < 100 UI/ml) and serum-specific IgE testing was performed, revealing moderate reactions to red kidney bean, green bean and lima bean. He was diagnosed with contact urticaria to green beans and irritant contact dermatitis of his hands.

Foods are the most frequent cause of immediate contact urticaria, including both raw fruits and vegetables. The prevalence of contact urticaria caused by food allergens in the general population is largely unknown. Immunological contact urticaria occurs most commonly in atopic individuals and is caused by immediate-type hypersensitivity with the development of a wheal and flare reaction following external contact with a substance. The diagnosis of contact urticaria may be confirmed by simple investigations such as skin prick testing and measurement of serum-specific IgE.

The development of immediate cutaneous hypersensitivity reaction after contact with green beans has rarely been reported. Igea et al¹ documented a female who developed contact urticaria and asthma while trimming raw green beans and inhaling vapor from boiling them. Several women experienced asthma and rhinitis after exposure to raw green beans, however all tolerated ingestion of cooked green beans. Bronchial challenge tests demonstrated positive results to raw but not cooked green beans². A severe anaphylactic reaction was experienced one-hour post ingestion of green beans in a 20-year-old female, who suffered gastroenteritis, generalized urticaria and collapse³. She demonstrated a greater reaction to skin prick testing to boiled green beans, than to raw green beans.

It is suggested that the green bean allergen may be heat-labile and that cooking at higher temperatures may be required for total denaturation¹. Green beans most probably contain both heat-labile and heat stable allergens, although no allergens have been fully characterized⁴. A 32 kDa IgG-binding protein which is a class I chitinase has been isolated from green beans, and closely resembles a major avocado allergen Prs a 1⁵. Class I chitinases

have been identified as major panallergens in fruits that are associated with latex-fruit syndrome. Green beans have not been associated with this syndrome, although it is interesting that our patient was allergic to latex and kiwi fruit.

Green beans are scientifically known as *Phaseolus vulgaris*, which also includes the kidney bean and are part of the legume family. An in vitro study tested eleven legumes' specific IgE binding using protein extracts and cross-allergenicity was demonstrated to be frequent among peanut, garden pea, chickpea and soybean. Even so, clinical studies have found that there is little cross-reactivity between members of the legume family⁴, although our patient reacted to red kidney bean, green bean and lima bean.

This case highlights a rare cause of contact urticaria to green beans, which contributed to multifactorial occupational hand dermatitis. We emphasise the importance of prick testing as well as patch testing food handlers with hand dermatitis.

References

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Figure 1. Green beans, accessed 10th April 2020, https://irepo.primecp.com/2016/03/266280/recipe-11600_Large500_ID-1494824.jpg?v=1494824.