## Anaphylaxis Caused by Green Tea: A Case Report

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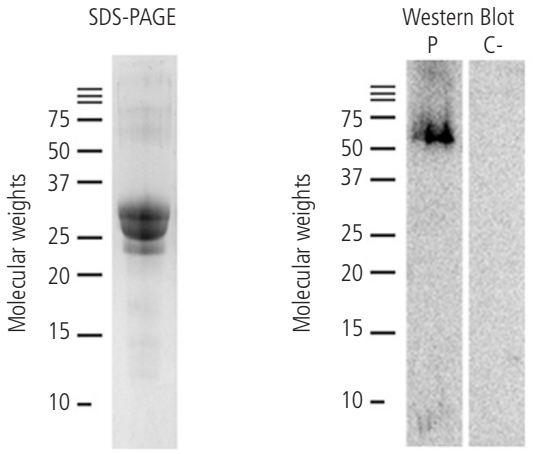


**Figure.** SDS-PAGE and Western blot of patient's serum tested against green tea extract. P indicates Patient; C–, negative control.

Allergic reactions caused by infusions are unusual. The most frequent reactions are to the Asteracea family (eg, *Matricaria chamomilla*). Green tea is increasingly popular owing to its beneficial health effects [1-7]. Hypersensitivity reactions in green tea manufacturing plants have seldom been reported [8-10].

We report the case of a 43-year-old fireman with a previous history of mild rhinoconjunctivitis during springtime for which he required no treatment. In December 2014, he experienced sudden flushing and slight facial itching followed by dry mouth and progressive dizziness 15-20 minutes after drinking a pure green tea infusion. He recovered completely without medication in approximately 30-40 minutes.

In February 2015, 30 minutes after eating a green tea ice cream, he experienced the same symptoms, as well as syncope and loss of vesical sphincter control. He required emergency medical attention. Electrocardiographic and serological results were normal. Before this second episode he had drunk a glass of wine, with no associated cofactors.

The patient reported previous frequent consumption of green tea and had not drunk any other types of tea between or after the episodes. He tolerated daily coffee intake.

Prick tests were carried out with the following commercial extracts: *Dermatophagoides pteronyssinus, Alternaria* species, dog and cat dander, grass pollen, olive tree pollen, *Taraxacum* species, milk, egg, wheat, gluten, gliadin, cashew, lupin bean, white fish, blue fish, shrimp, peanut, walnut, peach-LTP, latex, *Anisakis* species, and sesame). Prick testing with black tea and English breakfast tea and prick-prick testing with both tea leaves yielded positive results only to English breakfast tea (16 mm). Prick tests with samples of red tea dust and infusion and green tea dust, infusion, and ice cream revealed a clearly positive response to green tea infusion (36 mm) and a less intense response to red tea infusion (16 mm), green tea dust (16 mm), and green tea ice cream powder (9 mm). These tests were prepared as solutions (10 mg/mL) of the different teas and the green tea ice cream powder was applied in a sterile saline solution. Three atopic controls showed negative results when tested with these extracts.

A blood sample was obtained. The result of a specific IgE determination (CAP, Thermo Fisher) against tea (*Camellia sinensis*; f222) was negative (<0.35 $kU_A/L$). The patient's serum was tested against green tea extract. SDS-PAGE and Western blot (Figure) revealed a protein band of approximately 70 kDa that did not appear when the test was repeated with serum from a negative control.

As the symptoms were very severe and the patient had a positive prick test result to other tea types, avoidance of all tea varieties was recommended.

Tea (*C sinensis*) is a perennial plant cultivated in tropical and subtropical climates. Green tea is obtained by drying tea leaves directly after steaming followed by fire roasting. Although green tea is reported to exert beneficial effects on the immune system [2-7], adverse reactions have also been described. In 2011, Otera et al [8] reported a case of hypersensitivity pneumonitis caused by inhalation of green tea dust after exposure to epigallocatechin (the main component of tea polyphenol). In 2003, Toshihiro et al [9] studied 11 workers from a green tea processing company who had been diagnosed with occupational asthma caused by epigallocatechin gallate. The authors reported respiratory symptoms after tea consumption in 5 patients.

More recently, Wu et al [10] reported the case of a young woman presenting with oropharyngeal and respiratory symptoms upon drinking green tea, which she had previously tolerated. The results of a skin prick test were positive with a 1/10 (wt/vol) green tea leaf solution. As in the case we report, IgE testing against *C sinensis* was negative. However, the authors did not carry out an immunological assay, which in our patient revealed IgE binding to a protein of approximately 70 kDa from the green tea extract.

In conclusion, we describe a case of anaphylactic shock after green tea ingestion in a patient with no previous occupational association with green tea. We demonstrated an IgE-mediated hypersensitivity reaction to a 70-kDa protein from green tea extract. While we do not know why the patient had positive results to English breakfast tea and not to black tea (English breakfast is a blend of different black teas), we suggest possible cross-reactivity. However, this issue requires further investigation.

 

To our knowledge, this is the second published case of food allergy caused by green tea not involving occupational exposure. Published articles on food allergy caused by green tea have shown an association with epigallocatechin gallate that does not correspond to the protein found in this case. We must therefore consider this 70-kDa protein a new source of food allergy to green tea.

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*Conflicts of Interest*

The authors received technical assistance from Diater Laboratories for the in vitro allergy study.

Fernando Pineda is currently an employee at Diater Laboratories.

*Previous Presentation*

Data from this article were presented in poster format during the SEAIC 2015 international symposium, which took place in Seville, Spain during October 22-24, 2017.

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