

Progress in allergic asthma research after ingestion of fruits

July 15 2014

Researchers at the UPM suggest that the interaction between two proteins can be the responsible for the allergic asthma episodes after eating an infected fruit.

A research group of the Centre for Plant Biotechnology and Genomics (CBGP) of Universidad Politécnica de Madrid (UPM) conducted infection assays of commercial kiwis with *Alternaria alternata* spores which is a pathogenic [fungus](#) involved in chronic asthma in children. Researchers studied the behavior of this fruit and they found that the infected kiwis had the major allergen of the fungus, although symptoms of rot were not seen. This could trigger the involuntary ingestion of the fungus found in this fruit causing an asthmatic crisis in people allergic to *Alternaria*.

Alternaria alternata is a fungus that proliferates in fruit and vegetables crops and also when are collected and are on sale for the final consumer. A protein known as Alt a 1 and related to the virulence is found in the spores, this protein is described as the major allergen of this fungus. According to this research, this protein can be a major cause of childhood asthma in US.

When a pathogen infects a plant, the defense response is activated producing an increase of certain proteins related to the defense (known as protein 5). Likewise, the fungus increases the production of the proteins involved in attacks or virulence. However, the symptoms of rot by *Alternaria alternata* are not seen in some fruits, for example, in

[kiwifruit](#). All this can cause the involuntary ingestion of the fungus when eating the fruit.

Researchers conducted tests by infecting commercial kiwifruit with spores of *Alternaria alternata* and they detected the presence of Alt a 1, a protein of fungal virulence. Also, researchers studied how this protein is involved in the activation of defense protein 5 in kiwifruit. Fourteen days after the infection, the kiwifruits showed a regular aspect without apparent development of the fungus, but through tests conducted in lab (microscopy of specific staining fungus and Kiwi proteins) they detected the presence of Alt a 1 in the pulp.

What is more, they observed that this fungal protein is found in the same areas that the defense protein of the kiwifruit. Using computer modeling techniques, they identified a surface area in Alt a 1 susceptible to interact with the defense protein. In that interaction, Alt a 1 is joined to a region of the [protein 5](#) of the kiwifruit causing a remarkable decrease of its defense activity. These results reveal that Alt a 1 is an inhibitor of the defense proteins of family 5 which is particularly important in processes of fungal infection.

Researchers did not observed development of the fungus in kiwifruit, but they indeed detected the presence of its major allergen through specific staining. From health point of view, the presence of Alt a 1 in apparently healthy kiwis is important since *Alternaria* is described as a major cause of [chronic asthma](#) in children. These results suggest that patients allergic to *Alternaria* can suffer an allergy attack after eating infected kiwifruit.

More information: GÓMEZ-CASADO, C; MURUA-GARCÍA, A; GARRIDO-ARANDIA, M; GONZÁLEZ-MELENDI, P; SÁNCHEZ-MONGE, R; BARBER, D; PACIOS, LF; DÍAZ-PERALES, A. "Alt a 1 from *Alternaria* interacts with PR5 thaumatin-like proteins". *FEBS*

Letters 588 (9): 1501-1508. [DOI: 10.1016/j.febslet.2014.02.044](https://doi.org/10.1016/j.febslet.2014.02.044). MAY 2014.

Provided by Universidad Politécnica de Madrid

Citation: Progress in allergic asthma research after ingestion of fruits (2014, July 15) retrieved 26 April 2024 from <https://phys.org/news/2014-07-allergic-asthma-ingestion-fruits.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.