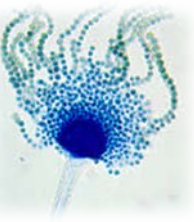
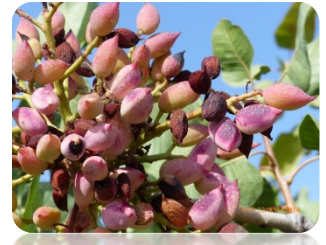


PROJECT TITLE



# Use of atoxigenic strains of *Aspergillus flavus* to prevent aflatoxin contamination of pistachio nuts



CLIENT

Biopesticide production industry  
Agricultural companies  
Agricultural pistachio associations  
Pistachio farmers

OUR TEAM

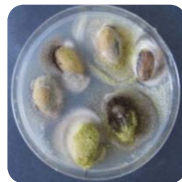
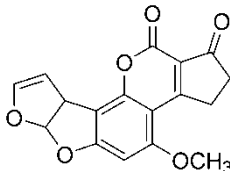
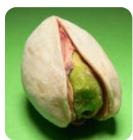
**Michalis D. Kaminiaris**  
**Assi. Prof. Dimitrios I. Tsitsigiannis**  
*Department of Crop Science*  
*Agricultural University of Athens*

OBJECTIVES

Select natural non-toxic Greek strains of *Aspergillus flavus* from pistachio orchards and reduce the contamination of the carcinogenic mycotoxin aflatoxin from pistachio nuts.

ENTREPRENEURIAL OPPORTUNITIES

Develop a biopesticide to minimize the levels of the carcinogenic mycotoxins aflatoxins in pistachio nuts.



**Aflatoxin B1**

SOLUTION

Soil application on the field in early summer of the biopesticide, containing sterile wheat or soybean seeds treated with conidia of a mixture of non-toxicogenic *Aspergillus flavus* strains. Non-toxicogenic strains compete and exclude the toxicogenic strains in the field, leading to no hazardous levels of aflatoxins.

Technology advancements

1. A technology that uses native strains of fungi and does not affect the environment by bringing invasive strains from other countries.
2. The biopesticide is applied on the orchard floor and not directly on to the consumable product.
3. Non-toxicogenic strains are very stable and do not revert to become toxicogenic.
4. The application of the strain(s) can be performed every other year instead of yearly application depending on the strain(s) that will be selected.

RESULTS

Competition assays and genetic and molecular analysis of a collection of ~200 *Aspergillus flavus* strains from Greece, led to the discovery of several non-toxicogenic isolates that were able to reduce aflatoxin levels about 90-95%.



**Aflasafe™:**  
commercial product



**Sporulation of non-toxicogenic strains in the field**

