Improved Mycotoxin Analysis

What is the purpose of this research project?

Mycotoxins are harmful compounds naturally produced by certain molds that grow on agricultural commodities and can cause disease in animals and humans. Even small quantities of these mycotoxins can be problematic, so improved detection methods are important for ensuring the safety of food and feed. The goals of this project are to develop and evaluate novel materials that bind to these toxins and can be employed in superior detection assays.

What problem does it address?

It is difficult to avoid production of mycotoxins, because of the prevalence of the organisms that produce these compounds, so developed countries have programs to detect the toxins and eliminate the contaminated product from the food supply. Monitoring is done at many levels by producers, grain elevators, processors, and regulatory agencies. Because of this, and the wide variety of these compounds, there is extensive monitoring for their presence in commodities as well as finished products. The performance of the methods depends upon the ability to detect contamination before it enters the food or feed supply. Therefore, improved techniques that can be implemented more rapidly and with better detection capabilities are necessary for inspection and screening of agricultural commodities.

What makes this research team unique?

This research team is well positioned to address fundamental issues in food safety due to a unique combination of expertise in one location. Participants in this project have expertise in toxin binding materials, analytical chemistry, chemical synthesis, and molecular modeling. In addition, this team has developed and assembled unique stockpiles of toxin binding materials useful for comparative evaluation and reference purposes.

Who are the potential customers for this technology?

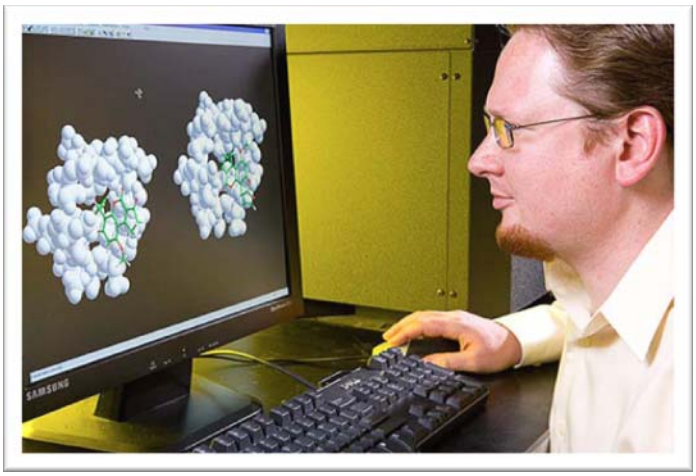
Customers of this research include: (1) Producers and processors that benefit from the improved mycotoxin assays and commercialization of the technologies, (2) scientists using the assays for enhanced monitoring of mycotoxins in the development of agricultural crops that are resistant to fungal contamination, (3) regulatory agencies, (4) scientists that can use the basic knowledge generated for other small-molecule applications, and (5) manufacturers of test kits for the toxins.

How is this technology transferred?

Materials developed from this project have been distributed to, or licensed by, over 30 organizations worldwide. They have been used to help scientists develop novel assays for numerous toxins, by manufacturers as components of toxin-detection test kits, and for the isolation of toxins. As such, the materials developed within this project are routinely used, worldwide, in the detection of natural toxins.

The Research Team

Research on this project is conducted by Dr. Chris Maragos (Research Chemist), Dr. Michael Appell (Research Chemist) and three support personnel. This project is part of a larger research unit on Bacterial Foodborne Pathogens and Mycology at the USDA's National Center for Agricultural Utilization Research (NCAUR).



Dr. Michael Appell examines the molecular interaction of a mycotoxin using computer modeling

Enzyme linked immunosorbent assay (Elisa) for mycotoxin detection in foods, grains, etc.

For more technical information about this project:
http://www.ars.usda.gov/research/projects/projects.htm?accn_no=410260

Contact Information

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