



FOOD SAFETY RESEARCH: A FOCUS ON

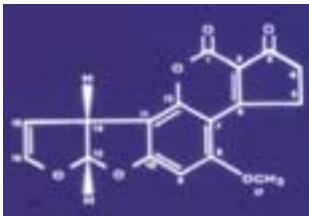
Aflatoxin Contamination

Aflatoxin contamination is a threat to the food supply and world markets because it damages animal and human health. Adverse impacts on animal and human health include acute toxicological effects such as liver damage and cancer. Aflatoxins can invade the food supply at any time during production, processing, transport or storage.

Aflatoxicosis, a condition that results from the ingestion of aflatoxin-contaminated food or feed, is primarily a hepatic disease affecting animals and humans. The condition can be found in animals worldwide, but the human health impact is usually only seen in third-world countries. There have been no cases of Aflatoxicosis reported in the United States.

Researchers are actively looking for methods to control aflatoxin contamination in susceptible crops. Classical plant disease prevention methods and routine technologies for controlling plant pathogens have generally been unsuccessful.

Cooperative efforts were established to control strategies in 1988 with the start of the annual Aflatoxin Elimination Workshop. The latest published conference report, Aflatoxin/Fumonisin Workshop 2000, is available on the FSRIO website.



The chemical structure of aflatoxin B1.

FSRIO Web site: A Resource for Food Safety Research Projects

For detailed information and descriptions of aflatoxin-related research projects, search the Food Safety Research database at <http://fsrio.nal.usda.gov/quicksearch.php>

The ARS National Program 108 Food Safety Annual Report 2000 Section: Mycotoxins:

http://www.ars.usda.gov/research/programs/programs.htm?np_code=108&docid=1271#MY



From Left to Right: *Aspergillus flavus* conidiophore; Walnut infected with *A. flavus*; Atoxigenic *A. flavus* biocontrol strain growing on kernels of wheat. Image Credit: ARS Southern Regional Research Center web site and the Cornell University Animal Science Department Web site.

RESEARCH AREAS

Fungal ecology and development of biological control agents.

Crop resistance through conventional breeding or genetic engineering techniques.

Crop management and fungal relationship.

Processing and new methods of sampling and toxin detection in crops.

Natural compounds that inhibit fungal growth.

GENERAL FACTS

- Aflatoxins are naturally occurring toxins that are metabolic byproducts of fungi, *Aspergillus flavus*, and *Aspergillus parasiticus*, which grow on many food crops under favorable conditions.
- Conditions that contribute to fungal growth and the production of aflatoxins are: a hot and humid climate, kernel moisture, favorable substrate characteristics, and factors that decrease the host plant's immunity (insect damage, poor fertilization, and drought).
- Food and food crops most prone to contamination are corn and corn products, cottonseed, peanuts and peanut products, tree nuts (pistachio nuts, pecans, walnuts, Brazil nuts) and milk.
- The major types of aflatoxins are B1, B2, G1, G2, and M1, with aflatoxin B1 being the most toxic, and usually predominant.
- Aflatoxin B1 is positively associated with liver cell cancer, supported by epidemiological studies done in Asia and Africa.
- Food and Drug Administration (FDA) action levels for aflatoxin present in human food is 20 ppb with the exception of milk is 0.5ppb. The action levels for most feed is 20 ppb.
- The FAO estimates 25 percent of the world's food crops are affected by mycotoxins.

ONLINE RESOURCES

Aflatoxin Collaborative Research Support Program (AF CRSP)

<http://msa.ars.usda.gov/la/srrc/aflatoxin/afcrsp.htm>

Foodborne Pathogenic Microorganisms and Natural Toxins Handbook: Aflatoxins

<http://vm.cfsan.fda.gov/~mow/chap41.html>

Aflatoxins: Occurrence and Health Risks

<http://www.ansci.cornell.edu/plants/toxicagents/aflatoxin/aflatoxin.html>

GIPSA's role in Aflatoxin Testing

<http://archive.gipsa.usda.gov/newsroom/backgrounders/b-aflatox.htm>

Minimizing Aflatoxin in Corn

<http://msucares.com/pubs/infosheets/is1563.htm>

Mycotoxin Newsletter

<http://vm.cfsan.fda.gov/~frf/iupac.html>

Mycotoxin Research Unit

http://ars.usda.gov/main/site_main.htm?modecode=36-20-30-00

Mycotoxins and Mycotoxins

<http://www.aces.edu/dept/grain/ANR-767.php>

Society for Mycotoxin Research

<http://www.mycotoxin.de/>

Testing for Natural Aflatoxin Inhibitors

<http://www.ars.usda.gov/is/AR/archive/jul98/afla0798.htm>

FDA Regulatory Guidance for Toxins and Contaminants

<http://www.ngfa.org/toxinsPDF-1.pdf>

FDA/CFSAN Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Feed

<http://www.cfsan.fda.gov/~lrd/fdaact.html>

This fact sheet is one of several information products developed by the Food Safety Research Information Office (FSRIO) at the USDA's National Agricultural Library (NAL). Fact sheets on specific food safety research topics are available on the FSRIO web site at:

<http://fsrio.nal.usda.gov/topics.php>

FSRIO is a unique resource for the food safety research community. The program features a web site that serves as a gateway to research information and includes a database of federally-funded research projects. The database is available for researchers, policymakers, consumers and others to learn about research initiatives, and assist the government in assessing food safety research needs and priorities, thereby minimizing duplication of effort. FSRIO also provides a reference service at no charge.

Created by: Tara Smith

Date: May 2002.

Updated: June 2006



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Food Safety Research Information Office
10301 Baltimore Ave, Room 304, Beltsville, MD 20705-2351
Phone: 301-504-7374 Fax: 301-504-7680
Email: fsrio@nal.usda.gov