

FACTS

- 4.5 billion people face uncontrolled risk of AF exposure and PCRSP has found wide-spread chronic dietary exposure in Africa.
- Peanuts and many staple foods are contaminated with AF at levels above those allowable for trade.
- Maize is one of the greatest sources of AF exposure.
- Strategies addressing AF and other mycotoxins generally occur only after large scale extreme contamination events.
- Mycotoxin exposure is not visible or easily tested, and thus remains a silent threat to most Africans.
- Research supported by PCRSP has found significant links between health, immunity, HIV and these mycotoxins.

High Aflatoxin levels cause:

- Suppressed immunity
- Decreased vitamin A, E
- Increased malaria infection
- Modified immunity in HIV suggesting rapid progression and higher transmission
- Increased TB in HIV patients
- Increased maternal anemia
- Increased poor pregnancy outcomes
- More underweight children under 5 years old

Using the peanut platform and innovative solutions to improve peoples' livelihoods

- Women
- Technology
- Capacity Building
- Industry

- Development
- Health
- Food Security
- Markets

PCRSP US research partners include the University of Georgia, University of Florida, University of Connecticut, Cornell University, Oklahoma State University, Virginia Tech, Texas Tech, North Carolina State, Texas A&M, University of Alabama Birmingham, Purdue University, Auburn University, and New Mexico State University.

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Front Cover: corn picture reference from Entomology Iowa State 2004.



Peanut CRSP Connecting HIV and MYCOTOXINS





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FROM THE AMERICAN PEOPLE

MYCOTOXINS

What are mycotoxins?

They are contaminants of food produced by molds. There are at least two common mycotoxins connected to the HIV epidemic, Aflatoxin (AF) and Fumonisin (FN).

Where are they are found and who is exposed?

These toxins are found in many foods but particularly important for peanuts (AF) and corn (AF and FN). People in areas with high consumption of these two foods are at greatest risk for mycotoxin exposure.

What do these mycotoxins do?

FN promotes esophageal cancer and makes membranes porous. AF promotes liver cancer and suppresses immunity and nutritional status. Therefore both of these toxins influence the occurrence of infections and the course of diseases.



Picture: Peanuts with aflatoxin (AF)-in the tropics high temperature and humidity create perfect conditions for molds, particularly the AF producing fungi.

AFLATOXIN: AN INVISIBLE FACTOR IN HEALTH

AF is clearly an immune suppressing agent, and HIV positive people with above median exposure have significantly lower immunity than their peers with less AF. Effectively, AF accelerates progression of the disease. Associated with this double immune suppression is a greater risk of active TB. Perhaps because of economic stress, HIV+ Ghanaians have greater exposure than their uninfected peers. AF is rarely tested for, nor do visually obvious symptoms appear when individuals are exposed to prevailing levels. Exposure is reflected in higher rates of easily diagnosed infectious diseases, like malaria.

Example of Aflatoxin levels	US (Texas)	Ghana (Ejura)	China (Guangxi)
Sample Number	151	755	136
Detection Rate (%)*	17.2%	90.7%	97.1%
Mean ± SD	0.89 ± 2.08	10.86 ± 19.01	7.34 ± 16.56
Range	0.05 - 16.01	0.44 - 286.73	0.28 - 175.83

*Detection rate (%) represents the percent of the sample testing positive for Aflatoxin.

CORN AND HIV IN AFRICA

PCRSP studies show a linear relationship between HIV death rates and corn consumption in Africa. We believe fumonism is likely to be playing a role in this relationship. The link between HIV and corn consumption, or other AF prone foods like peanuts, is particularly critical in Africa where AIDS rates are high and food is limited. Quality food security is essential in countries where health risks are high.

When food is scarce, all food is consumed, even contaminated food.



Legend

Mortality Rates per 100,000 (WHO) 2004

HIV/AIDS

- 11.51 - 500.00
- 500.01 - 1000.00
- 1000.01 - 1500.00

Maize Consumption per Person kg/year (FAO) 2007

- 0.00 - 35.00
- 35.01 - 70.00
- 70.01 - 105.00
- 105.01 - 140.00
- 140.01 - 175.00

Map: Sub-Saharan African countries showing maize consumption and HIV rates. The median consumption level is 26kg/y per person, and HIV deaths are per 100,000. For Somalia, data was not available for either disease and/or consumption of maize.



“Women are the gatekeepers of food quality, both as purchasers and vendors”

Dr. Jonathan Williams, PCRSP Director



PEANUT CRSP FIXING THE PROBLEM

- Early Detection**
 - Managing pests during production to reduce mycotoxins
 - Testing and monitoring levels of toxins
- Storage**
 - Using industry partners to develop low moisture and anaerobic storage facilities
- Food Processing**
 - Separating contaminated food from healthy food
- Market-Based Approaches**
 - Creating incentives to price-differentiate poor quality foods with uncontaminated foods
- Education and Awareness**
 - Working with Women Associations to let them lead communities in mycotoxin management
- Innovative Solutions**
 - Cutting edge work—PCRSP researchers find the use of a mineral additive to foods can reduce contamination by binding the toxin making it inert and harmless to humans

