Mycotoxin contamination in Tanzania: quantifying the problem in maize and cassava in households and markets

Donor: United States Agency for International Development (USAID) – AfricaRising program of Feed the Future

Timeframe: 2012

Background: Several mycotoxins exist, produced by a plethora of fungi, and toxin profiles differ across crops, countries and regions within countries. Maize, among the most important staples across Tanzania, is one of the crops most prone to aflatoxins. Mycotoxin contamination of cassava, the most important smallholder crop in Tanzania, is ill-quantified although visual observations of processed cassava in households and markets show severe contamination by several fungi. LC-MS/MS, a new detection method using liquid chromatography, is now capable of quantifying more than 50 toxic metabolites in a single analysis. Recently, several studies aimed at establishing prevalence of key mycotoxins in the region have been initiated, although only a few have been carried out in Tanzania, and all have focused on aflatoxin and fumonisins. Several indicators allude to high exposure levels among maize and cassava-growing rural households, such as (1) erratic rainfall, and high temperature and humidity levels in crop production areas; (2) presence of predominantly small farm holdings (85% of maize in Tanzania is grown on less than 1 ha) that produce for informal, local markets and that escape regulation mechanisms; and (3) a general lack of awareness about mycotoxins and their effects.

Villages (green circles) in Mtwara region of Tanzania where Ministry of Agriculture staff collected maize and cassava samples for conducting a prevalence study of aflatoxins

Project summary: Quantification of mycotoxin contamination is a first and essential step in addressing the problem. The objective of the project is to quantify mycotoxin contamination levels on maize and cassava in Tanzania, and provide an objective basis for commissioning interventions to dramatically improve the health and livelihoods, and increase income of rural households. Proper quantification of mycotoxin contamination will provide the basis for (1) risk assessment of key mycotoxins, which in turn will help in identifying target areas for intervention; (2) harmonization of mycotoxin standards for enhancing trade in the region, and (3) stimulating local monitoring/surveillance and enforcement mechanisms, thereby ensuring that the staples consumed locally are safe.

Objectives

- to quantify key mycotoxins among toxic microbial metabolites in maize and cassava in rural households and markets
- to sensitize stakeholders in Tanzania about occurrence of key mycotoxins, allowing targeted mycotoxin mitigation strategies
- to establish a prevalence database that can guide mycotoxin risk assessment and risk mapping activities in the country and hence strengthen standards and regulation mechanisms

Outputs

- contamination from at least five types of mycotoxins (aflatoxin, fumonisin, ochratoxin, zearalenone, deoxynivalenol) in maize and 50 mycotoxins in cassava quantified in 1,000 geo-referenced samples collected from AfricaRising intervention areas in Tanzania
- key mycotoxins affecting maize and cassava in Tanzania communicated to stakeholders
- risk-prone areas (hotspots) requiring immediate intervention identified. scale of the aflatoxin problem in maize and groundnut value chains quantified

Major partners: International Institute of Tropical Agriculture (IITA), Interuniversity Department for Agrobiotechnology (IFA-Tulln, Austria), Ministry of Agriculture, Sokoine University of Agriculture, Tanzania Food and Drugs Administration

Target country: Tanzania

Crops: cassava, maize