

POLICY BRIEF

REDUCING AFLATOXINS IN MAIZE TO IMPROVE INCOME OF SMALLHOLDER FARMERS IN GHANA

POLICY BRIEF NO. 1/2013

Introduction

Aflatoxins are secondary metabolites produced by the fungi *Aspergillus flavus* and *Aspergillus parasiticus* and mostly found in maize, groundnuts, cassava, and yam chips. These toxins are also potent causes of cancer and suppress the immune system causing humans



and animals to be more susceptible to diseases. They are chemical compounds which have been found to be toxic to humans and animals.

Moreover, aflatoxins are also huge non-tariff barriers to national and international trade since agricultural products such as maize and groundnuts that have more than permissible levels of contamination are rejected in both standardized national and international markets. As is the case with most fungi, the spores of aflatoxin-producing fungi are found

in most soils, in the air and many other organic substrates. Indeed, fungi or their spores are found everywhere. The fungi infect the maize in the field and in storage.

In Ghana, levels in maize above the national permissible levels (total aflatoxin $15\mu\text{g}/\text{kg}$) have been found in sixty-six (66) samples out of a total of two hundred and two (202) samples analyzed over the past three years and still counting. In a study conducted by the Food Research Institute (FRI) of the Council for Scientific and Industrial Research (CSIR), aflatoxins were detected in a total of a hundred and twenty-three samples. The lowest and the highest amounts reported over the period were $0.05\mu\text{g}/\text{kg}$ and $462.07\mu\text{g}/\text{kg}$ respectively.

Aflatoxins have been found in maize and maize products, peanut and peanut products and many other food commodities over the years in Ghana and the Techiman Municipality in particular. In the Techiman Municipality, SEND-GHANA is collaborating with the Food Research Institute (FRI) and the Ecumenical Association for Sustainable Agriculture and Rural Development (ECASARD) to educate smallholder farmers on preventing aflatoxins in their maize while also advocating government to fulfill its commitments to provide broader and better extension services and enhanced storage facilities for smallholder maize farmers.

Smallholder farmers in the Techiman Municipality in the Brong Ahafo Region of Ghana who are mostly women frequently use poor drying techniques in storing their maize resulting in the spread of aflatoxins. By working directly with smallholder farmers to improve the quality of maize, ECASARD, the Food Research Institute and SEND-GHANA are hoping to attract retailers and the World Food Programme (WFP) to buy maize from smallholder farmers, thereby improving their household level income and national level food security.



Why bother?

Aflatoxins have recently been of much public concern in view of their effect on the health of the populace. This has led to the setting of permissible limits by regional groupings, continents and countries to protect their citizenry. The Ghana Standards Authority has set a maximum aflatoxin total of 15ug/kg for maize (GS 211-1: 2003 2nd edition). They are reported to be carcinogenic and immunosuppressive.

The health and nutrition implication of aflatoxins and other mycotoxins (toxic substances produced by fungi) impact negatively on livelihoods, particularly of poor smallholder farmers and their families who have limited freedom for food choices. Aflatoxins have also been identified as a health problem rooted in the entire food chain, thus requiring a multi-disciplinary and well coordinated approach for analysis, action and solution.

Where and how are aflatoxins produced?

High temperatures and high relative humidity in Ghana as is the case in the Tropics are good conditions for the growth of these fungi. When grains are not well dried, the excess water in the grain promotes the growth of these aflatoxin-producing fungi in the grain leading to the accumulation of the toxins.

Damage to the grain due to insects, rodents and mechanical means increases the risk of contamination as the fungal spores gain increased access to the grain.

Bad and inappropriate cultural practices, post harvest as well as storage practices also result in increased aflatoxin contamination.

High temperature and drought conditions during grain fill are common features that result in pre-harvest contamination.

What can be done?

Unfortunately when the grains become contaminated it is difficult to decontaminate them. The key word therefore is prevention.

“Aflatoxins are noiseless killers and they undermine human health and stunt the growth of children but they are not often visible on the corn when purchased, once the maize is infected, nothing can be done to remove the toxins as they are very stable compounds even at high temperatures making the maize unwholesome. The fungi and their spores are destroyed by high temperatures but not the toxins”, says Mr Anyebuno, the Head of the Aflatoxin Laboratory at the Food Research Institute at a workshop organized jointly by ECASARD and SEND-GHANA with funding from the Southern Africa Trust to officially launch the “Aflatoxin control in maize Project in Techiman”.

Mr Ahiadu Azuma, Ministry of Food and Agriculture (MOFA) Director for Nkoranza South who is collaborating with ECASARD in the project has advised farmers to keep cleanliness on the farm to assist in the prevention of moulds and aflatoxins. He has also encouraged farmers in the Techiman Municipality to regularly seek and implement the knowledge they acquire from Agricultural Extension Agents.

Rapid and effective drying of the grain to desired moisture content ($\leq 13\%$ mc) is a sure way of preventing the growth of the aflatoxin-producing fungi.

Manual sorting of discoloured, damaged, immature, and shriveled grains will significantly reduce the levels of aflatoxins in a lot of maize grains.

ECASARD and the Food Research Institute in partnership with SEND-GHANA are currently

working with farmers to reduce aflatoxins in maize to make it more marketable. The Project partners have also translated existing research and studies on the prevention of aflatoxins in maize into easily understandable community education materials that are being used to train smallholder farmers. Researchers have engaged directly with farmers and are providing advice and ongoing support in the Techiman Municipality and the surrounding operational districts of ECASARD. Multi stakeholder Policy Dialogues have been planned at the district and national levels to offer smallholder farmers the opportunity to speak directly to policy makers to emphasize the importance of adequate extension services, drying and storage facilities to assist in preventing aflatoxins, increase productivity and increase income of small holder maize farmers.

Where can one test samples for aflatoxins?

The CSIR- Food Research Institute Toxicology Laboratory is accredited to ISO/IEC 17025 by the South African National Accreditation System (SANAS) for aflatoxin analysis on maize and maize products as well as peanut and peanut products. The analysis is by High Performance Liquid Chromatography (HPLC).

Policy Recommendations

Based on the issues identified by the Project, the following policy recommendations are made as part of efforts to address the aflatoxin problem of maize in Ghana:

1. The Ministry of Food and Agriculture (MOFA), Grains Development Board and Ministry of Health should as a matter of utmost importance recognize exposure to aflatoxins as a major public health issue; incorporate prevention and control of exposure to aflatoxins in health, agricultural and social development policies and provide scientific advice for its prevention in Ghana.

2. The Ministry of Food and Agriculture (MOFA) should provide mechanical driers to ensure quick and effective drying (especially during the rainy season).

3. The Directorate of Agricultural Extension Services of the Ministry of Food and Agriculture (MOFA) should increase education of farmers by Agricultural Extension Agents (AEAs) on best cultural practices to minimize on-field contamination among smallholder farmers.

4. The Districts Directorates of Agriculture should collaborate with Grain West Africa (GWA) and other private sector organisations to provide storage infrastructure with the requisite conditions to prevent contamination and eliminate or reduce physical damage to grains during shelling. The GWA has the capacity to purchase, store and sell commercial quality maize from Ghanaian farmers by providing innovative storage management of grains from the local market with the utilization of Silo bag Technology.

5. The Grains Development Board in collaboration with the Ghana Standards Authority (GSA) and the Ghana Grains Council should institute and enforce a grading system to provide premium pricing for good quality maize.

6. The government of Ghana through the Ministry of Environment, Science, Technology and Innovation should increase funding to the Food Research Institute to support research to control aflatoxin contamination in Ghana.

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SEND-GHANA

A28 Regimanuel Estates, Nungua Barrier

Sakumono, Accra, Ghana.

Tel: 233-0302-716860 / 716830

Fax: (0302) 716860

Mobile: 0289549858

E-mail: info@sendwestafrica.org

Website: www.sendwestafrica.org



CSIR-Food Research Institute

P. O. Box M20, Accra

Tel: 233-0302-519091-5

Fax: 233-0302-500331/519096

E-mail: director@foodresearchgh.org

Location: Behind the Ghana Standards Authority
near Tetteh Quarshie Interchange, Accra