FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

POLICY BRIEF: FUNGAL TOXINS AND FOOD INSECURITY

In 2004, a prolonged drought in Kenya led to a maize scarcity. Starving villagers resorted to consuming moldy maize that would normally have been discarded or used for animal feed. In the Makueni District in Kenya 317 people from 1 to 83 years old fell ill after eating the moldy grain and 125 of them died.[1] **They were poisoned by aflatoxin – a potent toxin produced by the fungus infecting the grain.** Grains and other dried foods are commonly contaminated with fungal toxins, including aflatoxin; the maize consumed during the 2004 drought had aflatoxin levels as high 8000 ppb. Codex's standard maximum level of aflatoxin in maize for human consumption is 20 ppb. Daily consumption of commodities severely contaminated by aflatoxins causes pulmonary edema, abdominal pain, and liver damage.[2] Chronic exposure to lower levels of mycotoxins can cause liver cancer, immunosuppression and impacts physical and cognitive development in children.[3]

The world is facing grain scarcity again. The conflict in Ukraine has compounded an already challenged global agricultural market resulting from the COVID pandemic. Ukraine alone is the fourth largest producer of the world's maize, and Russia and Ukraine account for 40% of the world's wheat production.[4] The conflict in Ukraine is also driving up the price of fertilizer. National commodity markets will be strained to maintain consumer supplies. Under this strain, it is critical for governments to take steps to prevent aflatoxicosis due to the consumption of contaminated commodities.

A health campaign to elevate public awareness of the dangers of mycotoxins, including aflatoxins, should be urgently mobilized. The campaign could include a warning of both acute toxicity and of chronic toxicity from mycotoxins. The potential for acute aflatoxicosis is heightened now, but reducing aflatoxins in dried commodities is a perennial challenge demanding government action.

Education is needed about the tools for controlling aflatoxin contamination, along with an awareness campaign about the dangers. The blue-green spores of the fungus are sometimes visible on dried foods, but infection is often invisible, so visually identifying and removing contaminated product is not a reliable preventative measure. Growers and marketers need to limit infection during production and limit fungal proliferation after harvest**. Dried foods need to be properly dried immediately after harvest and kept dry in storage and all handling steps before dried foods are eaten.**

In a government sponsored awareness campaign, low-cost postharvest tools that should be made easily accessible to growers and traders could be highlighted. The Feed the Future Innovation Lab for Horticulture's DryCard costs only USD$1.50 and reliably indicates if a commodity is dry enough to prevent fungal growth. It is also reusable. The **Horticulture Innovation Lab's Pallet Dryer and Chimney Solar Dryer,** and the **Feed the Future Innovation Lab for the Reduction of Postharvest Losses (PHLIL)** Grain Dryers are low-cost drying technologies that offer significant advantages over traditional drying methods. Hermetic storage such as Purdue's Improved Crop Storage (PICS bags) or GrainPro's bags prevent well-dried commodities from re-absorbing moisture.

Increasing public awareness of the lethal dangers of aflatoxin exposure combined with sharing information on the available tools to combat it are actions that governments should take. Governments may also want to consider monitoring dried foods in the market for aflatoxin contamination and excessive moisture content during this time of global food insecurity.

- For more information about the DryCard, Chimney Dryer, and Pallet Dryer visit www.horticulture.ucdavis.edu
- For more information about PHLIL's Dryer visit www.k-state.edu/phl/
- For more information about PICS bags visit www.picsnetwork.org and for GrainPro bags www.grainpro.com

[1]Outbreak of Aflatoxin Poisoning — Eastern and Central Provinces, Kenya, January – July 2004. (2004). Morbidity and Mortality Weekly Report, 53(34), 790-793.
[2]Probst C, Njapau H, Cotty PJ. Outbreak of an acute aflatoxicosis in Kenya in 2004: identification of the causal agent. Appl. Environ. Microbiol. 2007;73:2762–2764
[3]Kensler, T. W., Roebuck, B. D., Wogan, G. N., and Groopman, J. D. (2011). Aflatoxin: a 50-year odyssey of mechanistic and translational toxicology. Toxicol. Sci. 120, 28–48. doi: 10.1093/toxsci/kfq283
[4]Rice, B., Hernandez, M., Glauber, J., Vos, R. (2022, March 30) IFPRI Blog: Issue Post: The Russia-Ukraine war is exacerbating international food price volatility. https://www.ifpri.org/blog/russia-ukraine-war-exacerbating-international-food-price-volatility

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For more information, visit http://horticulture.ucdavis.edu.

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