

ADDITIONAL STUDIES ON AFLATOXIN AND HEALTH

STUDIES ON AFLATOXIN'S IMPACT ON HEALTH

HIGHLIGHTS

- Aflatoxin is classified by the International Cancer Research Institute as Class 1 human carcinogen.
- 25% of World Food Crops are affected (FAO).
- 5 billion people are potentially exposed to aflatoxin in the developing world (Williams, et al, CDC).
- 40% of all liver cancer occurs in Africa, and it is estimated that 5-30% is caused by aflatoxin (Liu, Y, Wu, F, 2010) and is synergistic with hepatitis B, affecting 400,000 worldwide.

BACKGROUND AND RATIONALE

Aflatoxins are highly toxic, cancer causing fungal metabolites known to cause immune-system suppression, growth retardation, liver disease, and death in both humans and domestic animals. According to the United Nations Food and Agriculture Organization (FAO), 25% of world food crops are affected, and countries that are situated between 40°N and 40°S are the most at risk, potentially exposing up to 5 billion people in the developing world.

Acute severe exposure results in direct liver damage, illness or death, and chronic sub-lethal exposure affects nutrition, the immune system and the risk of cancer. Because aflatoxin is successfully regulated in developed countries, the human medical research was focused on its link to cancer; research by CP Wild found that 10% of males in

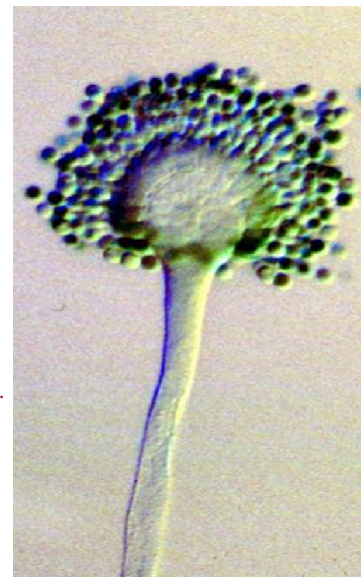
Gambia die of liver cancer while a separate study found that 10% of all adult deaths in Qidong, China, were due to this cancer. The rate of liver cancer is reported to be up to 60 times higher in the aflatoxin hotspots of Mozambique than in the USA,

While aflatoxins are well recognized as a cause of liver cancer, they have additional important toxic effects. In farm and laboratory animals, chronic exposure to aflatoxins compromises immunity and health.

According to a study (Williams, et al, 1106-1122) entitled "Human Aflatoxicosis in Developing Countries", the authors argue that aflatoxin potentially influences 6 of the 10 most important health risks identified by the WHO for developing countries, accounting

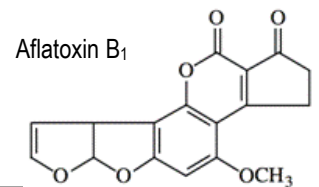
for 43.6 % of the DALYs where short lifespan is prevalent. Young children remain particularly vulnerable, significantly hindering children's growth and development. Previous work carried-out by the Consultative Group on International Agricultural Research (CGIAR) constituent International Institute of Tropical Agriculture (IITA) has shown that 99% of children at weaning age in Benin and Togo are highly exposed to serious health risks linked to aflatoxin, leading to reduced growth and immune response.

With aflatoxin seriously affecting maize and groundnut production, aflatoxin exposure poses the greatest risk to populations who rely on these commodities as their main staples.



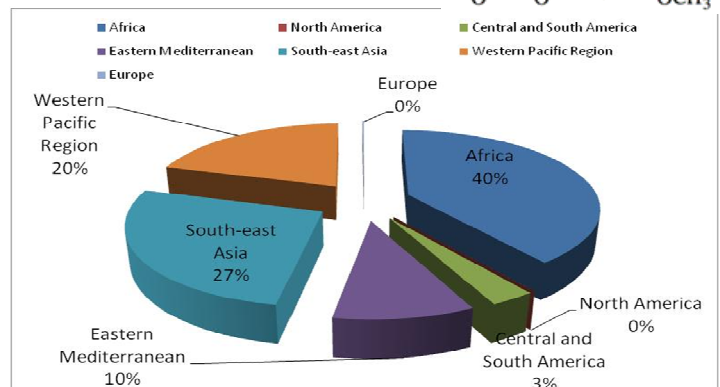
As a result, millions of people living in developing countries are chronically exposed to aflatoxins through diet. In Kenya, there were 125 deaths out of 317 reported cases of aflatoxicosis in 2004 with similar events repeated during 2005 to 2008. In 2010, ten percent of Kenya's maize harvest is contaminated by aflatoxin and deaths were reported. A holistic, coordinated effort to mitigate aflatoxin in Africa is needed to improve health and trade.

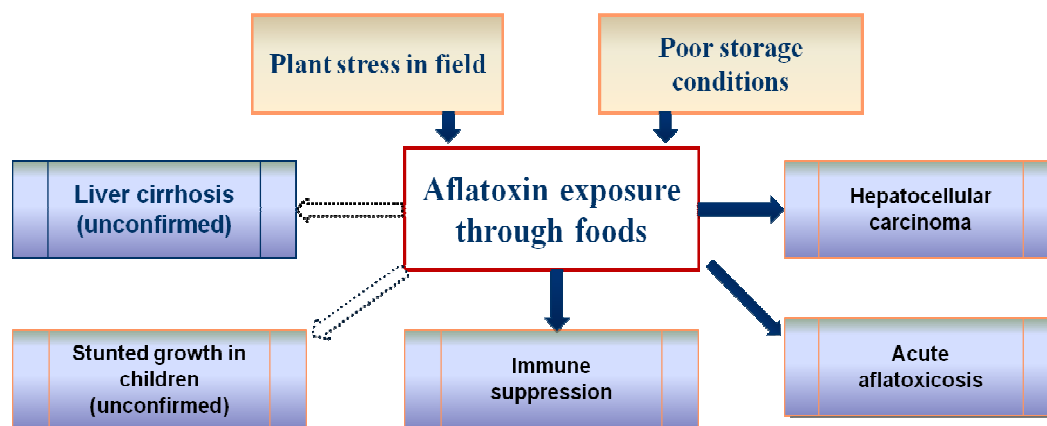
*Aflatoxins are poisons produced by a fungus called *Aspergillus flavus*. They are highly toxic and are known to cause: immune-system suppression, growth retardation, impede the uptake and utilization of micronutrients in human systems, liver disease, cancer, and death*



WHERE DOES AFLATOXIN INDUCED LIVER CANCER OCCUR?

- According to a 2010 study by Liu, Y, Wu, F (2010), in collaboration with WHO, it is estimated that aflatoxin causes between 5 to 30 percent of all liver cancer cases in the world. Highest incidence of 40 percent is in Africa.
- The study estimates that there are between 25,200 to 155,000 global aflatoxin induced liver cancer cases per year.
- Overall acute aflatoxicosis is most likely under-diagnosed and under-reported.
- 317 acute cases were reported in Kenya in 2004 due to eating home grown maize, resulting in 125 reported deaths.





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