

Systematic Literature Review of Mycotoxins with a One Health Perspective

Sirma AJ^{1,2}, Lindahl J², Kiama TN^{1,2}, Senerwa DM^{1,2}, Waithanji EM², Kang'ethe EK¹, Grace D²

1. University of Nairobi

2. International Livestock Research Institute, Nairobi

Introduction

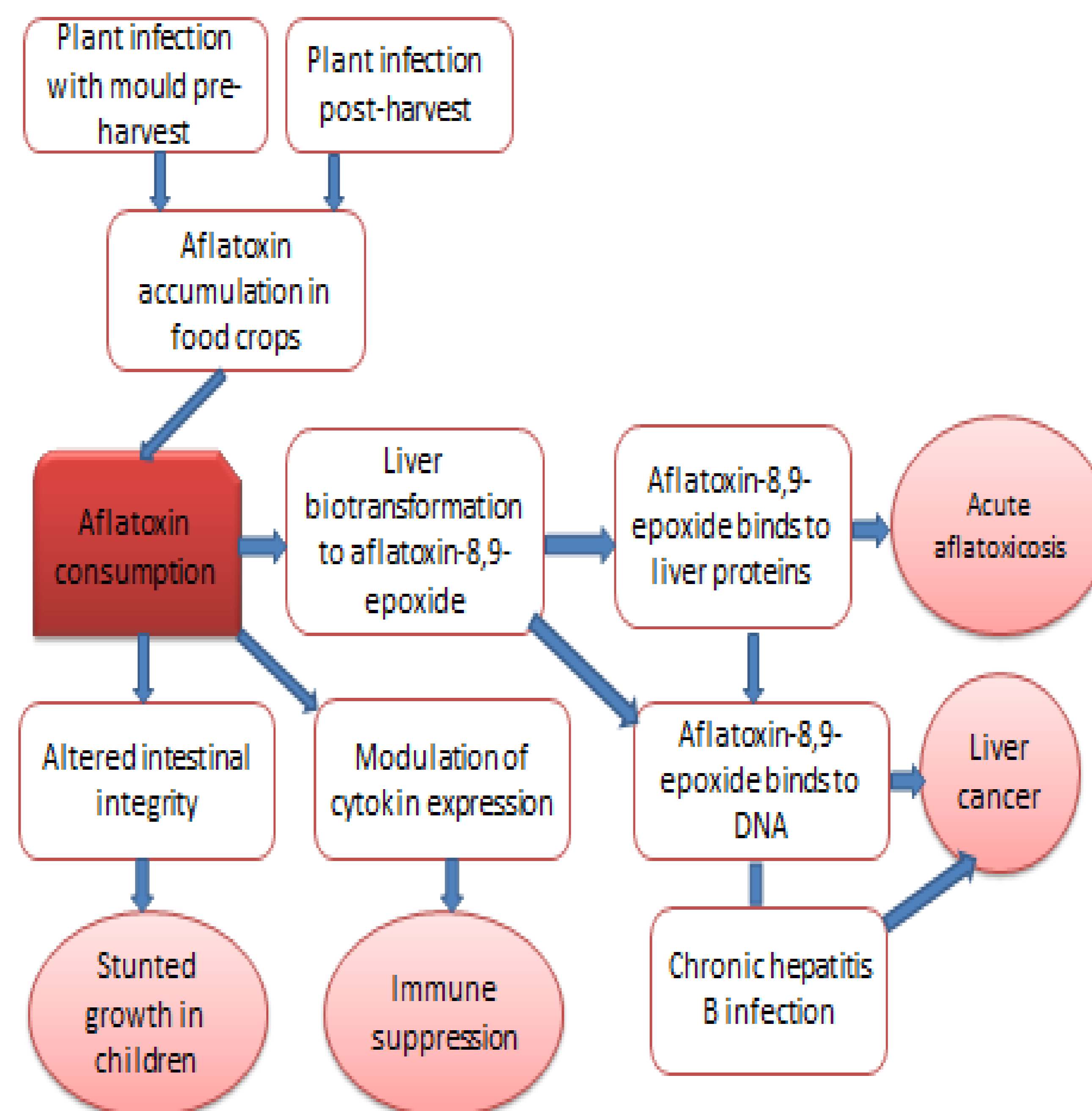
Mycotoxins are food contaminants that pose significant public health risks. They are produced in cereals and forage under favourable conditions of temperature, relative humidity/moisture and poor storage.

Mycotoxin contamination of foods and feeds has raised public health concern due to detrimental health effects. The health effects vary from a minor gastrointestinal irritation to death.

Aflatoxins and fumonisins are mycotoxins produced by moulds of the genus *Aspergillus* and *Fusarium* respectively. These are the two major mycotoxins in Africa commonly occurring in staple foods such as maize and groundnuts.

Major health effects of aflatoxins and fumonisins in humans include cancers, hepatotoxicity and nephrotoxicity. In livestock, reduced feed efficiency and productivity occurs.

This detailed literature review was conducted in order to highlight the health, economic and social impact of mycotoxins on humans and animals in East Africa.



Aflatoxins disease pathways in humans



Small-scale maize plantation in Kenya

Findings

- In East Africa region warm tropical climate promotes fungal growth and subsequent mycotoxin production increasing the risk of exposure
- According to CDC, an estimated 4.5 billion people in developing countries are exposed to aflatoxins through their diet. FAO estimates that 25% of world crops are contaminated with mycotoxins
- Acute exposure: Death; Repeated outbreak of aflatoxin poisoning in Kenya has claimed more than 150 human lives since 1982
- Chronic exposure: Cancer and suspected stunting in children
- Economic: morbidity and mortality in animals and humans, increased veterinary and physician costs, domestic and international losses from rejection of foods/feeds above regulatory limits
- An estimated \$ 670 million is lost annually by African food exporters of cereals and dried fruit, in trying to meet European Union aflatoxin standards
- Livelihoods of millions in East Africa affected by the mycotoxin threat on staple crops

Materials and Methods

- Detailed systematic literature review based on standard approach
- Search databases used: Cab direct, Google scholar, Pubmed and African Journal online
- Secondary sources of literature: books, newspapers, project reports and magazines
- Qualitative and quantitative information retrieved from the search and presented in this review

Key messages

- Chronic human exposure to mycotoxins in East Africa is a real danger from widespread contamination of staples (e.g. maize)
- Chronic exposure to aflatoxins is a causative factor for primary liver cancer
- Data on economic and social impact of mycotoxins in East Africa is incomplete
- There is a need to undertake risk and economic assessments of aflatoxins and fumonisins with a One Health approach in East Africa to guide policy and research in its management