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SIIR technology addressing Mycotoxins contamination in Agri-exports & Public health

Why is Mycotoxins a health concern?

Once food gets contaminated with mycotoxins, they cannot be destroyed by normal cooking processes and can expose consumers to the risk of contamination directly through food consumption or indirectly through feed.

Mycotoxins consistently constitute the highest risk category for notifications and every year, they are found among the “top ten” hazards reported annually by the RASFF (Rapid Alert System for Food and Feed) established by the European Commission.

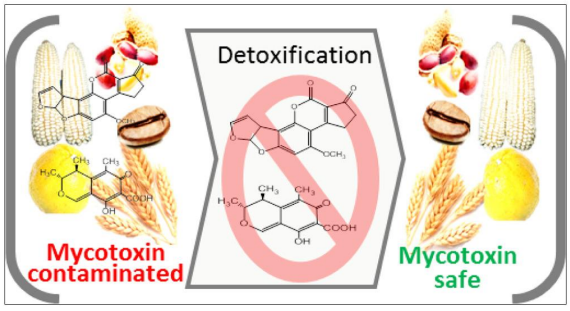
Mycotoxins have the potential for both acute and chronic health effects via ingestion, skin contact, inhalation, and entering the bloodstream and lymphatic system and have carcinogenic, teratogenic, hepatotoxic, mutagenic, and immunosuppressive effects to the liver.

What are Mycotoxins?

Fungi are ubiquitous in nature, capable of attacking crops in the field or during storage and can survive within a wide range of environmental factors. Fungi invade commodities extensively consumed by humans and animals. As a result of their growth on foodstuff, fungi produce low molecular weight compounds known as Mycotoxins. Several hundred different Mycotoxins (a diverse group of 300-400 mycotoxins) have been identified, but the most commonly observed Mycotoxins include Aflatoxins (AFB1, AFB2, AFG1, AFG2), Aflatoxin M1, Ochratoxin A, Patulin, Fumonisins, Zearalenone, Trichothecenes and Deoxynivalenol.

What are the factors responsible for Mycotoxins Production?

The fungi that produce Mycotoxins can emerge either in the field (in soil, decaying vegetation and grains undergoing microbiological deterioration) or during postharvest transportation or storage. Temperature stress and high moisture content are an important cause of fungi growth on crops in the field and are also associated with the growth of fungi in stored grain.



What will be the economic impact of this concern?

The economic impact of Mycotoxin is diverse, from loss of human and animal life to reduced livestock production, disposal of contaminated foods and feeds and investment in research. As a result, regulations have been implemented to set the limits of Mycotoxin in various food commodities intended for consumption.

The Food and Agriculture Organization has estimated that 25% of the world's crops are affected by Mycotoxins each year, with annual losses of around 1 billion metric tons of foods

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and food products. Additional costs associated with Mycotoxins include cost of management at all levels. These economic impacts are felt all along the food supply chains. On a global scale, the impact of Mycotoxins on human health is most significant with losses in monetary terms through health care costs and human lives lost.

Is there any concern on the Indian Trade?

According to RASFF, India received about 12.2% of RASFF notifications. As per analysis of EU and US data 2002-2008, the reason for border rejections of food and feed products from India is mainly due to Mycotoxins contamination which was high in 2019 especially that of basmati rice, marine products, spices and fruits & vegetables. Moreover, Indian exporters faced rejections during March 2020 from Netherlands for rejection of peanut consignments and rejection of groundnut kernels consignment from the United Kingdom for Aflatoxin contamination.

How can SIIR help in addressing this problem and help Indian exporters?

Shriram Institute for Industrial Research, Delhi holds the capability to assess various samples for the determination of Mycotoxins residues in food and feed with fast turn-around-time based upon modern techniques and centralized instrumentation facilities as per regulatory requirement involving a wide array of in-laboratory testing that includes extracting, clean-up columns and separation techniques. Most official regulations and control methods for Mycotoxins are based on High-performance liquid techniques with Fluorescence detection (HPLC-FLD), Liquid Chromatograph Mass Spectrometer (LC-MS/MS) & Enzyme linked immune-sorbent assay (ELISA). SIIR has the capabilities for its detection using different techniques.

What is SIIR proposal for Preventive approach?

SIIR pursues its mission to protect human health and the environment. It is a priority for the Institute to reduce border rejection of consignments due to Mycotoxins contamination. As a preventive approach for cross border rejections, SIIR proposes sampling and quality check of Pre-harvesting (seeds, soil and groundwater); Agriculture products at the time of harvest & post-harvesting; Food & Feed samples after processing & packaging and during storage period.

On account of catering the needs of Food industries, SIIR proposes the surveillance collection of different samples of food and feed; Imparting training to Industry personnel's and Small Scale Entrepreneurs for residual analysis; Performing rejection analysis and fault findings.

SIIR Research focus on decontamination of Mycotoxins in food products

SIIR has high power Gamma Irradiation with Co 60 as radiation source and fully automatic computerized plant setup as per the design and norms of BRIT/AERB which can be used to sterilize the food products. SIIR can perform research to optimize and implement this technology for destruction of Mycotoxins in various food commodities. Shriram Institute for Industrial Research is a single point solution provider for all technical requirements.

The way forward

Please visit our facilities and witness the infrastructure developed at SIIR to solve this problem. SIIR will be happy to have a partnership with the exporters organization to solve this problem in various commodities.

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