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MYCOTOXINS IN 2026: GLOBAL TRENDS, CURRENT CHALLENGES AND THE SITUATION IN ROMANIA

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Abstract

Mycotoxins remain a major food and feed safety concern in 2026 due to their widespread occurrence, toxicological effects and economic impact. Produced mainly by fungi of the genera Aspergillus, Fusarium and Penicillium, these secondary metabolites can contaminate cereals, maize, oilseeds, dried fruits and other agricultural commodities throughout the food and feed chain. The most relevant contaminants include aflatoxins, deoxynivalenol (DON), zearalenone (ZEN), fumonisins and ochratoxin A (OTA). This paper provides an overview of the current global situation of mycotoxin contamination, with particular emphasis on Romania. Contamination levels are influenced by climatic conditions, agricultural practices, fungal ecology, harvesting and storage conditions. Climate variability and extreme weather events may further modify the distribution and occurrence of mycotoxigenic fungi, creating additional challenges for food safety monitoring. The paper also addresses the potential effects of mycotoxin exposure on human and animal health, including hepatotoxic, nephrotoxic, immunotoxic, genotoxic and endocrine effects, as well as the carcinogenic potential of certain compounds. Particular attention is given to the importance of cereals and maize in the Romanian agricultural sector and to the need for continuous surveillance. Modern analytical methods, preventive agricultural practices, appropriate storage conditions and effective mitigation strategies are essential for reducing exposure. An integrated One Health approach involving food safety, agriculture, veterinary medicine and public health is increasingly important for managing mycotoxin risks in 2026.

Introduction

Mycotoxins are toxic metabolites produced by fungi of the genera *Aspergillus*, *Fusarium*, and *Penicillium*, which can contaminate crops either before harvest or during storage. Their presence in food and animal feed poses a risk to human and animal health and presents a challenge for the safety of the food supply chain. Contamination is influenced by climatic conditions, agricultural practices, and storage methods. Maize is particularly vulnerable to aflatoxins and fumonisins, while wheat and other cereals are frequently associated with DON and ZEN. In Romania, episodes of drought and high temperatures can increase the risk of maize contamination, underscoring the need for continuous monitoring and proper storage conditions.

Global trends and mycotoxins of concern

The risk depends on the type of crop, weather conditions, and storage practices. Maize is significant regarding aflatoxins and fumonisins, while temperate cereals are frequently associated with DON and ZEN. Ochratoxin A (OTA) is particularly relevant for coffee, certain cereals, and spices. Furthermore, multiple mycotoxins can occur simultaneously in the same sample.

Table 1. *The main mycotoxins of interest, susceptible products and associated effects*

Mycotoxin	Products at significant risk	Primary concern
Aflatoxin B_1 (AFB_1)	Corn, nuts and seeds, spices	Genotoxicity and carcinogenicity
Fumonisins (FUM)	Corn and corn-derived products	Toxic effects in animals; risk associated with animal feed
Deoxynivalenol (DON)	Wheat and other cereals	Feed refusal and digestive issues, particularly in animals
Zearalenone (ZEN)	Cereals contaminated with Fusarium spp.	Estrogenic and reproductive effects
Ochratoxin A (OTA)	Coffee, cereals, spices	Renal toxicity, particularly relevant in cases of chronic exposure
Aflatoxin M_1 (AFM_1)	Milk and dairy products	Transfer from contaminated animal feed into milk

The situation in Romania

Climate and Crops
- Drought and high temperatures can promote the contamination of maize with aflatoxins;
- During the drought-affected 2023–2024 agricultural year, high levels of contamination were reported in maize, whereas aflatoxin levels in common wheat were relatively low, according to the cited analysis.

Aflatoxin B_1 in maize: 506 µg/kg
- The maximum value reported within the Romania–Bulgaria–Serbia–Hungary regional context, linked to export rejections.

Monitoring
- ANSVSA: monitoring of AFB_1, total aflatoxins, OTA, DON, ZEN, fumonisins, and T-2/HT-2 toxins;
- Challenge: public data regarding contamination and its distribution by county are fragmented;
- Priority: risk-based monitoring and the centralization of national results.

Health impact and risk monitoring

Human Health
- Aflatoxins: genotoxic and carcinogenic potential; associated with liver cancer;
- Other mycotoxins: potential toxic effects on various organs and biological functions.

Animal Health
- Reduced feed intake and productivity;
- Potential effects on immunity and reproduction;
- AFM_1 in milk: transfer resulting from the consumption of feed contaminated with AFB_1.

European notifications regarding mycotoxins
- Year 2022: 485 (number of notifications);
- Year 2023: 401 (number of notifications).

Mycotoxins were the third most frequently reported category of hazards in the European ACN/RASFF system in both years. The figures represent the number of notifications, not the percentage of contaminated products.

Regulation and methods
- Regulation (EU) 2023/915: maximum levels for contaminants in food;
- Regulation (EU) 2023/2782: sampling and official analysis for mycotoxins;
- Screening: ELISA and rapid immunochromatographic tests;
- Confirmation: HPLC and LC-MS/MS.

Prevention, priorities

- ***In the field:*** *reducing crop stress and insect-related damage.*
- ***At harvest:*** *harvesting at the optimal time and minimizing delays.*
- ***During storage:*** *rapid drying, moisture control, and hygiene.*
- ***On dairy farms:*** *managing feed to reduce the risk of AFM_1.*

Field → Harvesting → Storage → Feed and milk

Conclusions

- *Early warning system for maize, based on meteorological data.*
- *Integrated national database for food, feed, and laboratory results.*
- *Strengthening confirmatory analysis capacity using LC-MS/MS.*
- *Improving feed-to-milk traceability and the control of high-risk imported products.*

In 2026, mycotoxin management requires moving beyond detection towards risk anticipation and prevention before contaminated products enter the food chain. In Romania, key priorities include climate-informed monitoring, particularly for maize, improved integration of food and feed surveillance data, enhanced analytical capacity, and better prevention practices during harvesting and storage. These measures can strengthen the protection of human and animal health and improve food and feed safety.