

Surveillance of *Fusarium* spp. and their mycotoxins in imported feed materials using rapid tests and portable PCR

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Key message

***Fusarium* spp., mycotoxins, portable real-time PCR, imported feed materials, rapid screening**

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Abstract

Fusarium spp. are among the most harmful cereal pathogens in temperate regions of Europe, producing various mycotoxins such as deoxynivalenol (DON), zearalenone (ZEA), fumonisins (FUM), and T-2/HT-2 toxins, which pose serious risks to animal and human health.

This study presents the results of a 2024–2025 border monitoring program in Poland, aimed at detecting *Fusarium*-derived mycotoxins in imported grains and feed materials. Analyzed matrices included maize, sorghum, millet, soybean meal, sunflower cake, linseed meal, sugar beet pulp, and others. Rapid screening was performed using an immunochemical fluorescence method with lateral flow strip tests and a Bioeasy reader.

In a subset of samples, molecular detection using SMART PCR was conducted to confirm the presence of *Fusarium* spp. DNA. This allowed for correlating the biological presence of the pathogen with observed mycotoxin contamination.

DON and ZEA were the most frequently detected mycotoxins. DON was predominant in maize and sorghum products, while ZEA was more common in oilseed-derived materials. Fumonisins and T-2 toxins were less frequent but still relevant in specific cases. The highest proportion of positive samples ($\geq 90\%$) occurred in maize, soybean meal, sunflower cake, sugar beet pulp, and distillers' dried grains.

Contamination levels were evaluated relative to EU maximum residue limits (MRLs). Samples were classified by %MRL: low ($\leq 25\%$), medium (26–100%), and high ($> 100\%$). No samples exceeded legal MRLs, but 87.8% fell into the medium-risk category. Notably, one maize sample showed high sub-MRL ZEA contamination (> 1000 ppb), signaling the need for close monitoring.

The study highlights the dual role of *Fusarium* spp. as both toxin producers and biological contaminants. The integration of rapid screening and portable molecular diagnostics (SMART PCR) provides an effective approach for enhanced feed safety surveillance.