22947 | Mycotoxins in Grains: A Hidden Threat to Health and Food Safety

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Background&Aim: Mycotoxins are toxic secondary metabolites produced by fungi, mainly *Aspergillus, Penicillium,* and *Fusarium*. Around 25% of the global harvest may be contaminated with mycotoxins, particularly in cereals, nuts, and dried fruits, especially under poor storage conditions or changing climate patterns (1). The European Rapid Alert System for Food and Feed frequently reports mycotoxin contamination. These toxins pose severe health risks, with both acute and chronic effects and contribute to economic burdens. This study investigates the health risks and economic impact of mycotoxin contamination, focusing on climate change on food safety (2). **Methods:** A literature review was conducted using PubMed (up to February 2025), and guidelines from EFSA and FAO. The keywords "mycotoxin" and "cereals" were used, and inclusion criteria included safety reports, reviews, and systematic reviews relevant to the study's objectives. **Results:** The main mycotoxins detected in grains include aflatoxins, ochratoxin A, deoxynivalenol, and zearalenone, mainly found in cereals such as maize, wheat, barley, oats, rice, and oilseeds. IARC classified aflatoxins (AFB1) as carcinogenic to human, and ochratoxin A as possibly carcinogenic. Between 2010 and 2020, 4.2% of food wheat was downgraded to animal feed due to aflatoxin contamination. This impact worsened between 2021 and 2023 as wheat prices rose from €200 to €300/ton. Records in north Italy indicate a rising trend of *Aspergillus flavus* outbreaks in maize, driven by Mediterranean warming (20% above the global average). Hot, dry summers in 2003, 2004, and 2012 (>35°C) already triggered infestations in previously unaffected crops. **Conclusions:** Mycotoxins pose a persistent risk to human and animal health due to their widespread occurrence in grain-based products. Climate change exacerbates contamination, increasing both health and economic burdens. Strengthening monitoring, storage conditions, and stricter regulations are essential to ensuring food safety.

Keywords: Mycotoxins, Cereals, Health, Climate change.

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