

Safe food and feed through an integrated toolbox for mycotoxin reduction and analysis

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Agriculture and food industries continue to be vulnerable to problems of contamination with mycotoxins produced by fungi with climate change making the occurrence of these toxic secondary metabolites – including new emerging toxins in food and feed - even more unpredictable. The total costs of losses due to mycotoxin contamination, such as reduced yields, cereal losses and increased costs for analyses may easily reach billions of Euros annually. To tackle these issues, existing knowledge must be combined with novel findings to bridge gaps on mycotoxin analysis and reduction along the food and feed chain.

By using novel analytical strategies for mycotoxin determination combined with mainstream information and communication technology, losses and waste along the food and feed chain could be better controlled, prevented, and traceable information to the supply chain and consumers can be provided.

An integrated toolbox for safe food and feed (www.mytoolbox.eu) shall involve a multi-actor and multi-disciplinary approach throughout the supply chain. Within such an effort, multi-analyte methods based on high performance liquid chromatography coupled to sensitive triple quadrupole mass spectrometers have become the tool of choice. LC-MS/MS based dilute-and-shoot methods provide the relevant information about the spectrum of mycotoxins and other relevant secondary metabolites of fungi which occur at the various stages of the food supply chain. By utilizing the power of high-resolution mass spectrometry (LC-HRMS) as the basis for stable isotope assisted based metabolomics approaches both plant-fungi interactions and the fate of mycotoxins during thermal processing can be studied. The paper will discuss the technical options and limitations, proper ways of validation and interesting fields of applications of novel integrated strategies and techniques to reduce and determine mycotoxins from field-to-fork in the EU, China and Sub-Saharan Africa.