

HOW DOES CLIMATE CHANGE IMPACT ON THE OCCURRENCE AND THE DETERMINATION OF NATURAL TOXINS

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In the meanwhile, it is indisputable that climate change takes place. The increasing levels of greenhouse gas emissions have significantly contributed to a rise of the global mean temperature by 0.89°C in the last century. Food safety and security could be profoundly compromised under changing climate scenarios. Under extreme weather conditions such as heat, drought and heavy rainfalls, fungal diseases and algal blooms have become increasingly unpredictable. Despite huge research investments, prevention and control of these toxic secondary metabolites remains difficult and the agriculture and food industries continue to be vulnerable to problems of contamination and especially in view of issues related to climate change: In 2013 Romania, Serbia and Croatia, reported aflatoxin M1 contamination of milk. Severe droughts in Serbia in 2012 resulted in 70% of the maize crop being contaminated with aflatoxins. Use of this maize to feed dairy cattle led to the high levels of aflatoxin M1 in milk, up to twice the EU legal limit. On the other hand, the catastrophic floods and the rainy summer in 2014 resulted in low levels of aflatoxin B1 with high levels of DON. Obviously, extreme weather conditions as a result of climate change is increasingly affecting the mycotoxin map in Europe and also world-wide. To the unpredictability of the range of mycotoxins occurring in food crops, there is an increasing need for LC-MS based multi-analyte testing methods to check for a wide spectrum of possible secondary metabolites in the food and feed chain. In addition, powerful metabolomics approaches are required to reveal novel findings on the plant-fungi interactions as a result of climate change and resistance breeding. Still, there is also a demand for improved rapid on-site methods and reference materials for a wide range of toxic secondary metabolites including so-called “emerging toxins” and masked mycotoxins.

Utilizing the power of multi-toxin screening of food and feed commodities this paper summarizes trends and amazing new findings which can be traced back to climate change and recent efforts in resistance breeding. The paper will also report on the increasing threat through paralytic shellfish toxins as a result of global warming.

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