Mycotoxins

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Mycotoxins are natural secondary metabolites produced by fungi on agricultural commodities in the field under a wide range of climatic conditions and during storage. The Food and Agriculture Organization (FAO) has estimated that mycotoxins affect a quarter of the world's food crops, including many basic foodstuffs and animal feeds, as well as cash crops such as coffee having high economic value. There are now more than 300 known mycotoxins of widely different chemical structures and differing modes of action—some target the kidney, liver, or immune system and some are carcinogenic. Common mycotoxins include aflatoxins, ochratoxin A, fumonisins and type A and B trichothecenes. National and international institutions and organizations such as the European Commission, the US Food and Drug Administration, the World Health Organization and FAO have recognized the potential health risks to animals and humans posed by food- and feed-borne mycotoxin intoxication and addressed this problem by adopting regulatory limits for major mycotoxin classes and selected individual mycotoxins.

The requirement to apply these regulatory limits has prompted the development of analytical methods for the identification and quantification of mycotoxins in various samples, such as food, feed and other biological matrices. The chemical diversity of mycotoxins and their different concentrations in a wide range of agricultural commodities, foods and biological samples poses a great challenge for sample separation and detection methods. To deal with the increasing number of sample matrices and mycotoxins of interest, fast and accurate analytical methods are needed. This demand has led to the development of rapid screening methods for single mycotoxins or whole mycotoxin classes based on immunochemical techniques including the use of fluorescence polarization. Moreover, highly sophisticated multianalyte methods based on liquid chromatography coupled with multiple-stage mass spectrometry have been developed to allow identification and accurate determination of mycotoxins simultaneously and often without the need for tedious sample preparation and clean-up procedures. Recently, for the analysis of mycotoxin-producing fungi and spores thereof, polymerase chain reaction and matrix assisted laser desorption/ionization time of flight techniques, respectively, have successfully been applied.

Despite the enormous progress in mycotoxin analysis, major challenges remain. Among these is the determination of conjugated mycotoxins, in which the toxin is usually bound to a more polar substance, such as glucose. These are referred to as masked mycotoxins, as they usually escape routine analytical methods but can release their toxic precursors after hydrolysis. Sampling, however, is still the major issue in mycotoxin analysis owing to the sometimes very heterogeneous distribution of the toxic metabolites in agricultural

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commodities and products intended for human and animal consumption.

This special issue is a timely reflection of the research progress related to mycotoxin determination. Thanks to the contributors, to whom I would like to express my great gratitude, recent developments in all the areas mentioned above can be presented in this special issue on mycotoxins. I am also very thankful to the reviewers for their thorough and on-time reviews of the papers and to the editorial team of *Analytical and Bioanalytical Chemistry* for their great cooperation.

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