



Mahendra Rai - Ajit Varma Editors

Mycotoxins in Food, Feed and Bioweapons

 Springer

Mycotoxins In Food Feed And Bioweapons

Arti Gupta, Nagendra Pratap Singh



Mycotoxins In Food Feed And Bioweapons:

Mycotoxins in Food, Feed and Bioweapons Mahendra Rai,Ajit Varma,2009-10-26 Mycotoxins are made by different biosynthetic pathways and they have an extremely wide range of pharmacological effects This book will update readers on several cutting edge aspects of mycotoxin research including topics such as new analytical methods for detection the adoption of an ancient Mexican process for detoxification of aflatoxins mycotoxin management in Ireland Lithuania and South America mycotoxin reduction through plant breeding and integrated management practices and natural aflatoxin inhibitors from medicinal plants Further contributions examine ochratoxins selected trichothecenes zearalenone and aflatoxin like gene clusters as well as sclerotial development in *Aspergillus flavus* and *A. parasiticus* Of particular interest are the chapters on the potential use of mycotoxins as bioweapons This book will stimulate new thinking on the need to develop therapeutic as well as preventative interventions to reduce the toxicological threat of mycotoxins

Mycotoxins in Food, Feed and Bioweapons Mahendra Rai,Ajit Varma,2009-11-03 Mycotoxins are made by different biosynthetic pathways and they have an extremely wide range of pharmacological effects This book will update readers on several cutting edge aspects of mycotoxin research including topics such as new analytical methods for detection the adoption of an ancient Mexican process for detoxification of aflatoxins mycotoxin management in Ireland Lithuania and South America mycotoxin reduction through plant breeding and integrated management practices and natural aflatoxin inhibitors from medicinal plants Further contributions examine ochratoxins selected trichothecenes zearalenone and aflatoxin like gene clusters as well as sclerotial development in *Aspergillus flavus* and *A. parasiticus* Of particular interest are the chapters on the potential use of mycotoxins as bioweapons This book will stimulate new thinking on the need to develop therapeutic as well as preventative interventions to reduce the toxicological threat of mycotoxins

Determining Mycotoxins and Mycotoxigenic Fungi in Food and Feed Sarah De Saeger,2011-02-07 Mycotoxins toxic secondary metabolites produced by mycotoxigenic fungi pose a significant risk to the food chain Indeed they may be the most hazardous of all food contaminants in terms of chronic toxicity and legislative limits on their levels in food and feed continue to be developed worldwide Rapid and reliable methods for the determination of both mycotoxigenic fungi and mycotoxins in food and feed are therefore essential This book reviews current and emerging methods in this area Part one focuses on the essentials of mycotoxin determination covering sampling sample preparation and clean up and key determination techniques such as chromatographic separation liquid chromatography mass spectrometry and immunochemical methods Part two then goes on to describe quality assurance official methods and performance criteria for determining mycotoxins in food and feed Topics covered include laboratory accreditation method validation and measurement uncertainty The development and analysis of biomarkers for mycotoxins are discussed in part three Individual chapters focus on detecting exposure in humans and animals Part four is concerned with the processes involved in determining mycotoxigenic fungi in food and feed It also describes the identification of genes and gene clusters

involved in mycotoxin synthesis as well as DNA barcoding of toxigenic fungi Finally part five explores some of the emerging methods for mycotoxin analysis ranging from bio sensing to spectroscopic techniques With its distinguished editor and international team of contributors Determining mycotoxins and mycotoxigenic fungi in food and feed is a standard reference for all those concerned with reducing mycotoxin contamination in the food chain Focuses on the essentials of mycotoxin determination covering sampling sample preparation clean up and key determination techniques Documents quality assurance and official methods and performance criteria for determining mycotoxins in food and feed Explores the processes of determining mycotoxigenic fungi in food and feed including the identification of genes and gene clusters **Masked**

Mycotoxins in Food Chiara Dall'Asta, Franz Berthiller, 2015-11-16 The first book to cover this fast developing field Masked Mycotoxins in Food will provide a full overview of the issues relating to the toxicology of masked mycotoxins present in food products Mycotoxins are naturally occurring chemicals produced by moulds that can grow on crops and foodstuffs Masked mycotoxins are modified mycotoxins due to this modification many cannot be detected using standard analytical techniques for example HPLC and ELISA and further research is needed to understand the health risks and threats from these modified compounds Masked mycotoxin research is an area of toxicological research that has gained significant interest and momentum in recent years The aim of this book is to provide a full picture of the topic from the masked mycotoxin formation in plants to their catabolic fate in humans The book also provides new insights and will highlight possible gaps in the knowledge base of this relatively new area Edited and written by World renowned experts working within the field this book is of interest to toxicologists and biochemists but also food scientists and agricultural researchers working in industry and academia **Mycotoxins in Food and Beverages** Didier Montet, Catherine Brabet, Ramesh C. Ray, Sabine

Galindo, 2021-06-11 Mycotoxins are secondary metabolites produced by fungi in a wide range of foods cereals peanut tree nuts dried fruits coffee cocoa grapes spices both in the field and after harvest particularly during storage They can also be found in processed foods of plant origin or by transfer in food products of animal milk eggs meat and offal Mycotoxins are of major concern since they can cause acute or chronic intoxications in both humans and animals which are sometimes fatal Many countries particularly in Europe have set maximum acceptable levels for mycotoxins in food and feed The book reviews the latest literature and innovations on important aspects of mycotoxins e g mycotoxin producing fungi and the related ecosystems mycotoxin occurrence toxicity analysis and management Quantitative estimations of impacts of climate change on mycotoxin occurrence have been made recently using predictive modelling There is also a growing interest in the occurrence and toxicity of multiple mycotoxins in food and feed including emerging or modified forms of mycotoxins Innovative tools were also developed to detect and quantify toxigenic fungi and their toxins In order to reduce the use of chemicals that are harmful to the environment and health of consumers alternative methods of prevention and decontamination of mycotoxins were tested in pre and post harvest using microorganisms natural substances or radiation

treatments Mycotoxins Study Cristina Juan García, 2021-09-07 The evaluation of the presence of mycotoxins in different matrices is achieved through different analytical tools including quantitative or qualitative determinations Studies of mycotoxin isolation using chromatographic equipment coupled to spectrometry detectors QTrap MS MS MS MS tandem QTOF MS MS are the most useful tools to control their presence All these studies represent key steps in the establishment of the limits of detection limits of quantification points of identification accuracy reproducibility and repeatability of different procedures The maximum permitted or recommended levels for mycotoxins in different matrices are within a wide range including the levels tolerated by infants and animals In addition decontaminated strategies as well as control and evaluation of exposure are demanded by authorities and food safety systems These authorities are not only concerned with the determination of mycotoxin presence but also with the toxicological effects of mycotoxins and in vivo or in vitro assays are necessary for a complete evaluation In fact these assays are the basis for the control and prevention of population exposure to mycotoxins in dietary exposure studies The most recent surveys focused on regulated mycotoxins aflatoxins fumonisins trichothecenes and zearalenones and emerging toxins such as enniatins and beauvericin in adult consumers while very few studies have monitored mycotoxin levels in infant products This Book of Toxins comprises 11 original contributions and one review New findings regarding presence of mycotoxins in aromatic and medicinal plants mango and orange juice juices pulps jams and beer from Morocco Pakistan and Portugal are reported In these studies innovative techniques to study their presence has been developed including liquid chromatography coupled with time of flight mass spectrometry to analyse mycotoxins and conjugated mycotoxins Novel strategies to detect mycotoxin presence and comparisons the characteristics of a rapid quantitative analysis of different mycotoxins deoxynivalenol ochratoxin A patulin sterigmatocystin and zearalenone are also presented using acetyl and butyrylcholinesterases and photobacterial strains of luminescent cells Additionally toxicological effects of zearalenone metabolites and beauvericin on SH SY5Y neuronal cells are presented One important point in the control of mycotoxins is related to decontaminated strategies and in this sense the efficacy of potentially probiotic fruit derived Lactobacillus isolates in removing aflatoxin M1 AFM1 is presented Other mycotoxin decontaminated techniques included in this book are electron beam irradiation EBI and degradation of zearalenone and ochratoxin A using ozone Finally a review that summarizes the newly discovered macrocyclic trichothecenes and their bioactivities over the last decade is included **Advances in Food and Nutrition Research** Fidel Toldra, 2019-07-24 Advances in Food and

Nutrition Research provides updated knowledge about nutrients in foods and how to avoid their deficiency especially for those essential nutrients that should be present in the diet to reduce disease risk and optimise health The series provides the latest advances on the identification and characterisation of emerging bioactive compounds with putative health benefits as well as up to date information on food science including raw materials production processing distribution and consumption always having in mind its nutritional benefits and health effects Contains contributions that have been carefully selected

based on their vast experience and expertise on the subject Includes updated in depth and critical discussions of available information giving the reader a unique opportunity to learn Encompasses a broad view of the topics at hand **Mycotoxins Occurrence in Feed and Their Influence on Animal Health** Maciej Gajęcki, Magdalena Gajęcka, Łukasz Zielonka, 2021-01-15 According to the presented studies the health condition of animals in rearing and breeding should be regularly monitored This would allow early detection of delicate deviations in the body of clinically healthy individuals Unfortunately regular monitoring of the health of animals in commercial production is not performed It follows that this type of research should be an introduction to further more inquisitive steps This can form the basis for further courses of action indicating which organs or tissues field doctors or researchers should be interested in and what to pay attention to in order to find the correct answer concerning the situation in the animal body In the future we should determine biomedical markers for use in precision veterinary medicine In human medicine this has been practiced with great success The problem however is that we are getting to know more and more substances produced by mold fungi This causes a build up of new interpretative problems causing health conditions diagnosis as well as analytical problems To fully understand the results we need new techniques to assess toxicological and chemical hazards including those related to undesirable substances We need a solid knowledge of the biological pathways underlying the toxicity and tolerance to interference factors toxicological processes We hope that the presented study will allow for a better understanding of mycotoxicoses that bother us and our animals which will allow for more effective preventive actions *Mycotoxins and Mycotoxicoses* Karuna Singh, Ankita Kumari, 2022-05-17 This book presents a comprehensive view on mycotoxins of agricultural as well as non agricultural environments and their health effects in humans and animals Mycotoxins have immunosuppressive effects but some of them can cause cancers mutagenicity neurotoxicity liver and kidney damage birth defects DNA damage and respiratory disorders The problem of mycotoxins is long lasting and their direct or indirect exposures to humans and animals must be further discussed The first chapter will cover the historical perspective of mycotoxins along with timeline while the second one will provide overview including classification of mycotoxins and mycotoxicoses The comprehensive information literature on traditional emerging and mushroom mycotoxins will be given in chapters 3 4 and 5 respectively Chapter 6 will deal with mycotoxins co occurrence poisoning whereas new and masked mycotoxins will be described in chapter 7 The important aspects of mycotoxin studies like extraction characterization and analysis and management strategies will be summarized in 8 and 9 chapters The last chapter of the book will cover the recent developments in toxicokinetic studies of mycotoxins The book will have the most up to date information and recent discoveries to deliver accurate data and to illustrate essential points to a wide range of readers including mycologists clinicians agricultural scientists chemists veterinarians environmentalists and food scientists **Fungal Diseases in Animals** Arti Gupta, Nagendra Pratap Singh, 2021-06-22 The importance of fungal infections in both human and animals has increased over the last few decades This book presents an

overview of the different categories of fungal infections that can be encountered in animals including lower vertebrates originating from environmental sources with or without transmission to humans In addition the endemic infections with indirect transmission from the environment the zoophilic fungal pathogens with near direct transmission the zoonotic fungi that can be directly transmitted from animals to humans mycotoxicoses and antifungal resistance in animals will also be discussed This book includes case studies and reviews the current state of knowledge on the mechanism of fungal attraction recognition infection extracellular hydrolytic enzymes and pathogenesis of nematophagous fungi The book also covers diagnostics fungal formulations as well as prevention methods It discusses strategies to access the fungal pathogen groups metagenomic analyses genomics secretomics metabolomics proteomics and transcriptomics In addition pathogen description understanding distribution and recent research results are provided *Pesticides and Pests* Shashi Bala Singh,Balraj Singh Parmar,Suresh Walia,2019-10-23 Pests and diseases inflict a devastating impact on the quantity and quality of food production Pesticides play a vital role in crop protection although their excessive use poses a potential health hazard and a threat to food security and human and environmental safety This book overviews developments on pesticides and pests that are relevant to agriculture in the Indian sub continent Asia and the world at large These topics impact free world trade both directly and indirectly The volume brings together the latest information about chemical botanical biorational pesticides and bioagents international specifications for pesticide formulations pesticide environment interaction and amendments to prevent leaching losses of pesticides in soil among other topics The issues of pest resistance herbicide resistant or tolerant crops and the changing global climate are also addressed This book is a valuable collection of chapters that will serve as a reference point for students scientists policy makers and other stakeholders interested in pesticides and pest control

Nanomycotoxicology Mahendra Rai,Kamel A Abd-Elsalam,2019-08-24 Nanomycotoxicology Treating Mycotoxins in Nanoway discusses the role of nanotechnology in the detection toxicity and management of different types of mycotoxins Sections cover the topic of nanomycotoxicology the application of nanotechnology for quicker more cost effective and precise diagnostic procedures of mycotoxins and toxicogenic fungi and the application of nanotechnology for the management of mycotoxigenic fungi New topics such as the application of nanotechnology in disease management disease forecasting and disease resistance mycotoxin detection and nanodiagnostic and molecular techniques are also presented With chapter contributions from an international group of experts this book presents an interdisciplinary reference for scientists and researchers working in mycotoxicology nanotechnology mycology plant science and food safety In addition it will be a useful tool for industrial scientists investigating technologies to update their nanotoxicology and nanosafety knowledge Discusses the role of nanotechnology in mycotoxicology Explores the application of nanomaterials for detection of mycotoxins Covers the role of nanotechnology in the management of mycotoxins and mycotoxigenic fungi **Present Knowledge in Food Safety** Michael E. Knowles,Lucia Anelich,Alan Boobis,Bert Popping,2022-10-08 Present Knowledge in Food Safety A Risk

Based Approach Through the Food Chain presents approaches for exposure led risk assessment and the management of changes in the chemical pathogenic microbiological and physical radioactivity contamination of food at all key stages of production from farm to consumption This single volume resource introduces scientific advances at all stages of the production to improve reliability predictability and relevance of food safety assessments for the protection of public health This book is aimed at a diverse audience including graduate and post graduate students in food science toxicology microbiology medicine public health and related fields The book s reach also includes government agencies industrial scientists and policymakers involved in food risk analysis Includes new technologies such as nanotechnology genetic modification and cloning Provides information on advances in pathogen risk assessment through novel and real time molecular biological techniques biomarkers resistance measurement and cell to cell communication in the gut Covers the role of the microbiome and the use of surrogates especially for viruses

Improving the evidence base on aflatoxin contamination and exposure in Africa Okoth, S.,2016-12-31 This report reveals that substantial knowledge is available about the aflatoxin challenge that plagues African farmers other agri entrepreneurs and governments Commissioned by the ACP EU Technical Centre for Agricultural and Rural Cooperation CTA in collaboration with the African Union Commission Partnership for Aflatoxin Control in Africa PACA this literature review reveals that a wide range of commodities that are traded nationally regionally and internationally are contaminated by aflatoxins African citizens and economies are negatively impacted as a result

Encyclopedia of Food Microbiology Carl A. Batt,2014-04-02 Written by the world s leading scientists and spanning over 400 articles in three volumes the Encyclopedia of Food Microbiology Second Edition is a complete highly structured guide to current knowledge in the field Fully revised and updated this encyclopedia reflects the key advances in the field since the first edition was published in 1999 The articles in this key work heavily illustrated and fully revised since the first edition in 1999 highlight advances in areas such as genomics and food safety to bring users up to date on microorganisms in foods Topics such as DNA sequencing and E coli are particularly well covered With lists of further reading to help users explore topics in depth this resource will enrich scientists at every level in academia and industry providing fundamental information as well as explaining state of the art scientific discoveries This book is designed to allow disparate approaches from farmers to processors to food handlers and consumers and interests to access accurate and objective information about the microbiology of foods Microbiology impacts the safe presentation of food From harvest and storage to determination of shelf life to presentation and consumption This work highlights the risks of microbial contamination and is an invaluable go to guide for anyone working in Food Health and Safety Has a two fold industry appeal 1 those developing new functional food products and 2 to all corporations concerned about the potential hazards of microbes in their food products

Aflatoxin Lukman Abdulra'Uf,2017-08-30 Aflatoxins are a group of highly toxic and carcinogenic substances which occur naturally and can be found in food substances Aflatoxins are secondary metabolites of certain strains

of the fungi *Aspergillus flavus* and *A. parasiticus* and the less common *A. nomius*. Aflatoxins B₁, B₂, G₁ and G₂ are the most important members which can be categorized into two groups according to the chemical structure. As a result of the adverse health effects of mycotoxins, their levels have been strictly regulated especially in food and feed samples. Therefore, their accurate identification and determination remain a Herculean task due to their presence in complex food matrices. The great public concern and the strict legislation incited the development of reliable, specific, selective and sensitive analytical methods for pesticide monitoring that are discussed in this book.

Soybean Hany El-Shemy, 2013-02-13 Legumes are important for the diet of a significant part of the world's population; they are a good source of protein, carbohydrates, minerals and vitamins. The importance of soybean lies in the overall agriculture and trade and in its contribution to food supply. Soybean contains the highest protein content and has no cholesterol in comparison with conventional legume and animal food sources. Furthermore, soybean is a cheap source of food and at the same time medicinal due to its genistein, photochemical isoflavones content. Soybean has been found to be extremely helpful in the fight against heart disease, cancer and diabetes among others. Soybean protein and calories are presently being used to prevent body wasting often associated with HIV. The importance of soybean nutrition intervention is amplified where medications are unavailable. Its economic potential inherent in a wide range of industrial uses can be harnessed to the benefit of smallholder soybean producers.

5th International Conference on Biomedical Engineering in Vietnam Vo Van Toi, Tran Ha Lien Phuong, 2014-11-18 This volume presents the proceedings of the Fifth International Conference on the Development of Biomedical Engineering in Vietnam which was held from June 16-18, 2014 in Ho Chi Minh City. The volume reflects the progress of Biomedical Engineering and discusses problems and solutions. It aims at identifying new challenges and shaping future directions for research in biomedical engineering fields including medical instrumentation, bioinformatics, biomechanics, medical imaging, drug delivery, therapy, regenerative medicine and entrepreneurship in medical devices.

Handbook of Agricultural Biotechnology, Volume 3 Charles Oluwaseun Adetunji, Julius Kola Oloke, 2024-04-02 **Handbook of AGRICULTURAL BIOTECHNOLOGY** This book provides state-of-the-art information about recent advancements in the application of nanobiofungicides for effective management of post-harvest diseases and agricultural fungal diseases including blights, mildews, molds and rusts. The book details the formulation and standardization of nanobiofungicides as well as their application in the management of biotic and abiotic stress. It provides relevant information on the isolation, characterization, purification and structural characterization of active constituents using spectroscopic techniques and explains the quarantine and regulatory issues that are associated with nanobiofungicides derived from plants and other biogenic sources as well as various regulatory bodies that manage the control of pesticides on agricultural products. Readers will learn about the application of nanobiofungicides when applied as a biocontrol agent against soil-borne and root-borne plant pathogens, the management of mycotoxin, the non-target effect of plant-based nanobiofungicides when applied in the greenhouse and field such as rate of CO₂ evolution, organic carbon

content enzymatic activity acidic and alkaline phosphatase dehydrogenases urease and protease and the effect on soil microorganisms using different assay techniques Furthermore the book provides information on several plant materials that could serve as nanobiofungicides and explains the procedure involved in the characterization of plant based nanobiofungicides using TEM SEM XRD EDX UV zeta potential dynamic light scattering Finally it offers a specific illustration on the application of microencapsulation and nanoformulation technology in the synthesis of plant based nanobiofungicides Audience The book is a useful resource for a diverse audience including industrialists food industry professionals agriculturists agricultural microbiologists plant pathologists botanists microbiologists biotechnologists nanotechnologists microbial biotechnologists farmers policymakers and extension workers Biology of Microfungi De-Wei Li, 2016-03-18 This reference book includes 24 chapters written by a group of experts in the different fields of microfungi and cover a broad range of topics on microfungi It provides the most updated information on the latest development in systematics and taxonomy of microfungi new techniques which were developed in the last ten years and their application in microfungi research After the International Code of Nomenclature for algae fungi and plants Melbourne Code was adopted by the Eighteenth International Botanical Congress Melbourne Australia July 2011 it has had a profound impact on mycology and its research Fungal nomenclature changes and its significance to fungal taxonomy and naming of microfungi in the future is discussed in detail Since dual names system for fungi developing both sexual and asexual states and fungi developing only asexual state is no longer available the first five chapters will clarify some confusion and provides perspective views on the direction for future research The next nine chapters cover microfungi and their ecological roles or functions in the different habitats air indoor aquatic marine plants soils etc The remaining 13 chapters cover the relationship of microfungi and humans good and bad and usage or application microfungi in different industries such as food agriculture forestry green technology pharmaceuticals and medicine as well as in our daily life The book bridges the gap between basic mycological research and applied mycology and provide readers a unique set of information and knowledge of microfungi generated from multiple angles in different fields of mycology

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