



EMAN BULLETIN

WINTER 2010

Project News

New factsheet

Impact of Mycotoxins on Sub-Saharan Africa : Nigeria as a Case Study

A new factsheet is available on the EMAN website. Impact of Mycotoxins on Sub-Saharan Africa : Nigeria as a Case Study can be found in the list of factsheets (number 18 of the Basic factsheets). Click [here](#) to view factsheet.

News from our sponsors:

ALLTECH:

Mycotoxins: where the threat lies in the upcoming months.

The 2010 growing season was atypical due to changes in weather patterns, a phenomenon taking place in many parts of the world. Many professionals in the Ag industry are starting to see this as reason to believe that current crops will present a high incidence of molds and mycotoxins. In some parts of the globe, nutritionists have seen the DM increase as much as 10% during the first week of September. Higher than optimal DM has been seen and some corn silage samples have been reported to be as high as 45% DM in conventional storage facilities. This increased DM leads to poor fermentation of silages and therefore, poor health and production.

During the 2010 World Mycotoxin Forum in the Netherlands during early November, specialists discussed the continuing threat of mycotoxins on animal health, which is still ignored in many parts of the world and controlled or minimized only in wealthier countries. Attention was also brought to the fact that even low levels of toxin ingestion may cause metabolic disturbances that affect animal health. The occurrence of masked mycotoxins was also emphasized as a key factor to be taken into consideration when evaluating the real impact of mycotoxins.

Masked mycotoxins are the result of mycotoxins binding with other feed materials such as glucose and therefore escaping detection via the normal analytical methods such as ELISA & HPLC. This could lead to the underestimation of the real mycotoxin level by up to 88% in some cases. In many cases, this explains why feed with low analyzed level of mycotoxins still cause problems on farm.

These authors have looked into the subject:

- Berthiller et al., 2005: vomitoxin masked in wheat by up to 30%.
- Liu et al., 2005: vomitoxin masked in wheat by up to 63%.
- Zhou et al., 2007: vomitoxin masked in barley by up to 88%

Only novel extraction methods, currently used only for research purpose, allow masked mycotoxins to be analyzed. In this article, Dr. Alexandros Yiannikouris presents the benefits and pitfalls of each testing method.

BIOMIN:

BIOMIN expands scope of mycotoxin-related information

Mycotoxin Survey

Since 2005, BIOMIN has undertaken extensive work surveying the occurrence of mycotoxins around the world. To date, over 11,000 samples have been analyzed, making this the biggest known worldwide survey of mycotoxins, and the most sought-after standard in mycotoxin risk management employed by the feed and grain





industry all over the world. With its quarterly mycotoxin survey report, BIOMIN provides every 3 months updated data on mycotoxin occurrence results by different regions worldwide to subscribers of www.biomin.net.

To get the latest report covering the 3rd Quarter of 2010, please visit www.biomin.net/

Mycotoxins.info

This webpage offers a scientific but concise overview on mycotoxins and mycotoxin-related topics with useful information for researchers, animal husbandry and agricultural entrepreneurs or simply for mycotoxin-curious minds through the entire supply chain. Recently mycotoxin-related literature reviews are published regularly with the aim to provide a detailed review about a specific and current topic like e.g. synergistic effects of mycotoxins.

For further information, please visit www.mycotoxins.info

Mycotoxin Channel

The Mycotoxin Channel consists of short webinars that address specific questions on mycotoxin problems and mycotoxin management issues around the world. Since its launch in 2009, more than 100 videos are published on a wide range of mycotoxin-related issues answered by renowned experts around the world. Topical sections include analysis, mycotoxin risk management, mycotoxins in general and its symptoms in different animal species.

To view the videos including the most recent ones, please go to www.youtube.com/mycotoxinchannel

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Conferences

1 - 4 December 2010

2010 ISM – MycoRed Joint Conference Penang Malaysia

http://www.mycored.eu/page/upcoming_events/28/2010_ism_-_mycored_joint_conference/

RECOMMENDED

4 – 6 April 2011

MycoRed Africa 2011 Conference

http://www.mycored.eu/page/news/45/mycored_africa_2011_conference/

RECOMMENDED

6 - 10 December 2010

MycoRed Training Course, Capacity Building in Mycotoxin-Safe Food Trade

http://www.mycored.eu/page/news/46/capacity_building_in_mycotoxin-safe_food_trade/

RECOMMENDED

Abstracts

Compiled and edited by Leatherhead Food Research

Abstracts from Leatherhead Food Research's Foodline Science database

(<http://services.leatherheadfood.com/foodline/index.aspx>).

(Abstracts of published papers on mycotoxins, which are selected from peer-reviewed journals. Major areas of mycotoxin research and analysis are covered, with an emphasis on mycotoxin occurrence in food).

Mycotoxin food and feed regulation and the specific case of ochratoxin A: a review of the worldwide status.

Duarte S.C., Lino C.M., Pena A.

Food Additives and Contaminants (ISSN : 0265-203X) 2010 (October), 27 (10), 1440-1450 (many ref.) En:en (saan: 806122)

The importance of mycotoxin regulations for food safety and the implications for international trade are discussed in this paper. The rationale for regulation for ochratoxin A, and the debate on the maximum levels are considered. Tables presenting the maximum limits of ochratoxin A in food and in animal feeds are presented. The authors conclude with a discussion of the need for more scientific data for supporting regulatory review.

Transfer of aflatoxin B1 and fumonisin B1 from naturally contaminated raw materials to beer during an industrial brewing process.

Pietri A., Bertuzzi T., Agosti B., Donadini G.

Food Additives and Contaminants (ISSN : 0265-203X) 2010 (October), 27 (10), 1431-1439 (39 ref.) En:en (saan: 806121)

The levels of aflatoxins and fumonisins were determined in the raw materials intended for industrial brewing process. Levels ranged from 0.31 to 14.85 mcg/kg (aflatoxin B1) and 1146 to 3194 mcg/kg (fumonisin B1) in maize grit. In the finished beer, detectable levels of aflatoxin B1 and fumonisin B1, but not of the other aflatoxins or fumonisin B2,

are reported. An average of 1.5% for aflatoxin B1 and 50.7% for fumonisin B1 are reported recoveries of the toxins from the beer. The authors conclude that if levels of these toxins do not exceed European Commission Regulation limits in the raw materials that exposure levels for consumers should not be compromised.

Foodstuffs. Determination of deoxynivalenol in cereals, cereal products and cereal based foods for infants and young children. HPLC method with immunoaffinity column cleanup and UV detection. BS EN 15891:2010.

British Standards Institute (ISBN : 978-0-580-63013-2) 2010 24pp En (saan: 806011)

A method is specified for the determination of deoxynivalenol in cereal products, such as baby foods and flour. The method involves use of HPLC, immunoaffinity column clean-up and UV detection.

Foodstuffs. Determination of patulin in fruit juice and fruit based puree for infants and young children. HPLC method with liquid/liquid partition cleanup and solid phase extraction and UV detection. BS EN 15890:2010.

British Standards Institute (ISBN : 978-0-580-65880-8) 2010 20pp En (saan: 806013)

The standard specifies a method for determination of patulin in fruit juices, fruit beverages and baby foods. The method involves the use of HPLC, liquid/liquid partition clean-up and UV detection.





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Foodstuffs. Determination of ochratoxin A in currants, raisins, sultanas, mixed dried fruit and dried figs. HPLC method with immunoaffinity column cleanup and fluorescence detection. BS EN 15829:2010.

British Standards Institute (ISBN : 978-0-580-63017-0) 2010 18pp En (saan: 806014)

The standard specifies a method for determination of ochratoxin A in currants, raisins, sultanas, mixed dried fruit and dried figs. The method involves the use of HPLC with immunoaffinity clean-up and fluorescence detection.

Co-occurrence of aflatoxins, ochratoxin A and zearalenone in Capsicum powder samples available on the Spanish market.

Santos L., Marin S., Sanchis V., Ramos A.J.

Food Chemistry (ISSN : 0308-8146) 2010 (October 1), 122 (3), 826-830 (30 ref.) En:en (saan: 805878)

The occurrence of aflatoxins, ochratoxin A (OTA) and zearalenone in paprika and chilli samples was examined in this study using HPLC with fluorescence detection. No sample had aflatoxins in levels higher than those legally permitted. Paprika and chilli samples contained more than one mycotoxin, and chilli samples generally had lower concentrations of specific and total aflatoxins than paprika samples. The need for additional legislation for these spices is suggested.

Low-mycotoxin coffee cherry products.

VDF FutureCeuticals Inc. Miljkovic D., Duell B., Miljkovic V. United States Patent 7 815 959 (US) 16.4.2003

En:en (saan: 805774)

A food product prepared from whole, substantially non-damaged coffee cherries is disclosed. The invention uses cherries picked at a sub-ripe stage and quick-dried after harvest to significantly reduce the likelihood of infestation of the coffee cherry with mould and fungi known to produce mycotoxins. The cherries are characterised by their extremely low concentration of mycotoxins, including various aflatoxins, fumonisins, ochratoxins, and/or vomitoxin. The food product preferably includes the bean, pulp, mucilage, and/or hull of the quick-dried coffee cherry, ground fragments of the coffee cherry, or an extract. It can be a tea brewed from the coffee cherry, a beverage containing an extract of the coffee cherry, or a liquid nutritional supplement containing an extract of the coffee cherry.

Lactic acid fermentation improves the quality of amahewu, a traditional South African maize-based porridge.

Chelule P.K., Mbongwa H.P., Carries S., Gqaleni N.

Food Chemistry (ISSN : 0308-8146) 2010 (October 1), 122 (3), 656-661 (30 ref.) En:en (saan: 805746)

The variation in protein, amino acids and mycotoxin contents as a result of fermentation of amahewu was examined in this study. Commercial corn meal was fermented in a traditional way, and levels of proteins and amino acids were determined. Amahewu samples were also collected from a rural village. Increased protein levels were found in amahewu, especially in samples with added yeast and bread flour, compared with levels in starter corn. Mycotoxins detected in corn samples were reduced following fermentation. The authors conclude that traditional amahewu fermentation might improve the nutritional quality of corn-based foods and reduce levels of toxic mycotoxins.

Herbal teas. The benefit:risk ratio.

Sarwar S., Lockwood B.

NUTRA Foods (ISSN : 1827-8590) 2010 9 (2), 7-17 (34 ref.) En:en (saan: 805715)

Herbal teas have been used as traditional medicines. The beneficial medicinal properties and reported toxic and adverse effects of herbal tea consumption are examined. The beneficial effects of herbal teas are considered in relation to antioxidant activity and the stability of antioxidants in herbal teas, antimutagenic activity and scavenging of nitric oxide radicals, and immune response activity in terms of antiallergic activity, antidiabetic properties and minerals content. The adverse effects of herbal teas are discussed with regard to the presence of secondary plant metabolites in herbal tea preparations, hepatotoxicity of alkaloids, carcinogenic activity of tannins, mycotoxins and safrole, allergic effects and haematological effects, as well as neural, gastrointestinal and cardiac toxicity, and oestrogenic activity. Contamination of herbal teas by toxic trace elements and pathogens is detailed, together with potential herb-drug interactions. Herbal teas might play an important role in prevention and treatment of cardiac conditions, diabetes and cancer, but the presence of naturally occurring toxic compounds has raised concerns about product safety.

The aflatoxin contamination of ground red pepper and pistachio nuts sold in Turkey.

Set E., Erkman O.

Food and Chemical Toxicology (ISSN : 0278-6915) 2010 (August-September), 48 (8-9), 2532-2537 (many ref.) En:en (saan: 805688)

This paper provides the results of a survey investigating the total aflatoxin (AFT), aflatoxin B1 (AFB1), and mould and yeast counts in unpackaged and packaged pistachio nuts and ground red pepper sold in Turkey between September 2008 and





February 2009. It was found that 17.1% and 23.1% of unpackaged ground red pepper samples contained AFT and AFB1 at levels greater than those permitted by law. Over 50% of unpacked pistachio nuts also contained detectable aflatoxin levels. A small number of unpackaged products had mould and yeast counts higher than those permitted by law.

Influencing factors on bread-derived exposure to ochratoxin A: type, origin and composition.

Duarte S.C., Bento J., Pena A., Lino C.M., Delrue-Matos C.

Food and Chemical Toxicology (ISSN : 0278-6915) 2010 (August-September), 48 (8-9), 2139-2147 (many ref.) En:en (saan: 805650)

This study investigated the ochratoxin A content of 274 samples of bread purchased in Portugal during the winter of 2007, using HPLC-FD. The results suggested a low level of contamination throughout all types of bread products, particularly in the Porto and Coimbra regions, and particularly in corn and wholegrain or fibre-enriched bread.

Determination of fumonisins in milled corn grains using HPLC-MS.

Dohnal V., Jezkova A., Polisanska I., Kuca K. Journal of Chromatographic Science (ISSN : 0021-9665) 2010 (September), 48 (8), 680-684 En:en (saan: 805631)

This paper describes a new method for the determination of fumonisins in corn using extraction with methanol-acetonitrile-water mixture and LC determination with MS detection. The limit of detection of the method was found to be 62.0 mcg/kg corn for fumonisin B1 and 58.5 mcg/kg corn for fumonisin B2. The method can be used for determination of fumonisins in milled corn samples.

Comparison between capillary electrophoresis and high performance liquid chromatography for the study of the occurrence of patulin in apple juice intended for infants.

Murillo-Arbizu M., Gonzalez-Penas E., Amezqueta S. Food and Chemical Toxicology (ISSN : 0278-6915) 2010 (August-September), 48 (8-9), 2429-2434 (29 ref.) En:en (saan: 805678)

This study evaluated the use of two capillary electrophoresis methods, based on MEKC and a CEC system, and one HPLC method for the analysis of patulin in apple juice samples intended for infants in Spain. It was found that capillary electrophoresis based on MEKC, and HPLC gave the best results, and both of these methods were comparable in terms of recovery, precision, selectivity and limits of detection. The patulin levels obtained by both of these methods correlated well and the average

patulin concentration in infant apple juice was found to be 8.0 mcg/litre.

Determination of aflatoxin levels in Sudanese edible oils.

Idris Y.M.A., Mariod A.A., Elnour I.A., Mohamed A.A. Food and Chemical Toxicology (ISSN : 0278-6915) 2010 (August-September), 48 (8-9), 2539-2541 (14 ref.) En:en (saan: 805689)

This study used HPLC to determine the aflatoxin B1, B2, G1 and G2 levels in 56 samples of groundnut, sesame and cottonseed oils from mills and factories in the Sudan. It was found that the highest occurrence of aflatoxins was in sesame oil, followed by groundnut oil, whilst none was detected in cottonseed oil. All the samples contaminated by aflatoxins were unrefined.

Special issue: Climate change and food science. (b.)

Various authors

Food Research International (ISSN : 0963-9969) 2010 (August), 43 (7), supplement 'Climate change and food science', 1866-1956 (many ref.) En:en (saan: 805515)

This publication continues with the following papers: 'How climatic changes could affect meat quality', by N.G. Gregory; 'Environmental impact of four meals with different protein sources - case studies in Spain and Sweden', by J. Davis, U. Sonesson, D.U. Baumgartner and T. Nemecek; 'Adaptation of Bacillus cereus, an ubiquitous worldwide-distributed foodborne pathogen, to a changing environment', by F. Carlin, J. Brillard, V. Broussolle, T. Clavel, C. Duport, M. Jobin, M.-H. Guinebretiere, S. Auger, A. Sorokine and C. Nguyen-The; 'Characterization of Bacillus sporothermodurans IC4 spores - putative indicator microorganism for optimization of thermal processes in food sterilisation', by A. van Zuijlen, P.M. Periago, A. Amezqueta, A. Palop, S. Brul and P.S. Fernandez; 'How will climate change affect mycotoxins in food?', by R.R.M. Paterson and N. Lima; 'Application of a HACCP-QMRA approach for managing the impact of climate change on food quality and safety', by D.P. Janevska, R. Gospavic, E. Pacholewicz and V. Popov; 'Simulation modelling and risk assessment as tools to identify the impact of climate change on microbiological food safety - the case study of fresh produce supply chain', by L. Jacxsens, P.A. Luning, J.G.A.J. van der Vorst, F. Devlieghere, R. Leemans and M. Uyttendaele; 'Environmental impact of novel thermal and non-thermal technologies in food processing', by R.N. Pereira and A.A. Vicente; and 'The food cold-chain and climate change', by S.J. James and C. James.

Methods for coffee cherry products.





VDF Futureceuticals Inc. Miljkovic D., Duell B., Miljkovic V. United States Patent 7 807 205 (US) (16.4.2003) En:en (saan: 805473)

A method of processing coffee cherries to yield a product having an extremely low concentration of mycotoxins is described. The invention uses sub-ripe coffee cherries to reduce the likelihood of mould and fungi infestation, as well as yield a product with desirable levels of flavour and high levels of nutrients. Sub-ripe coffee cherries are hand-picked, quick-dried, comminuted, then contacted to a solvent to produce an extract incorporating desirable levels of nutrients such as polysaccharides, caffeine, polyphenols, and polysaccharides. The resulting extract does not easily spoil in the presence of microorganisms that produce mycotoxins, such as moulds and fungi. The invention is suitable for preparing beverage products such as a tea, juice, and a carbonated beverage.

The pH and mobile phase composition effects ochratoxin A fluorescence at liquid chromatography.

Dohnal V., Pavlikova L., Kuca K. *Journal of Chromatographic Science* (ISSN : 0021-9665) 2010 (October), 48 (9), 766-770 En:en (saan: 805312)

Changes in fluorescence of ochratoxin were examined in this study, and the effect of ratio of aqueous/organic solvent, ionic composition of solution and pH were determined. Conditions yielding the highest fluorescence intensity were compared with results obtained under commonly used chromatographic methods. The method was applied for the analysis of spiked and naturally contaminated cereal samples.

Biomonitoring of Fusarium spp. mycotoxins: perspectives for an individual exposure assessment tool.

Cano-Sancho G., Marin S., Ramos A.J., Sanchis V. *Food Science and Technology International* (ISSN : 1082-0132) 2010 (June), 16 (3), 266-276 (many ref.) En:en (saan: 805321)

Techniques used to biomonitor the exposure of fumonisins, deoxynivalenol, zearalenone or T2 toxin are reviewed in this paper. The use of biochemical indicators for assessing individual exposure to contaminants is evaluated with reference to studies monitoring these toxins in biological fluids.

Smaller, stronger, faster labs.

Canavan N. *Food Quality* (ISSN : 1092-7514) 2010 (April-May), 17 (2), 22-25 (0 ref.) En:en (saan: 805292)

Concerns over food safety have led to funding becoming available in the US for the development of

techniques for the rapid detection and identification of pathogens. This article looks at a selection of the products and procedures developed, including: the BAX polymerase chain reaction (PCR) system for the detection of Salmonella in peanut butter, and the detection of Listeria, Vibrio, Escherichia coli O157:H7 and Cronobacter; an enzyme that reduces enrichment time; immunomagnetic separation technology; RNA-based assays; electrochemical techniques for analysing headspace gas; and liquid chromatography-mass spectrometry for the detection of mycotoxins in beer.

Process for degrading zearalenone in a feed product employing laccase.

Novozymes A/S Viksøe-Nielsen A., Soerensen B.H. *European Patent Application* 2 231 863 (European Patent Office) (14.12.2007) En:en 12.12.2008 (Saan: 805251)

An improved process for detoxifying feed products contaminated by mycotoxins, particularly zearalenones, using laccases is disclosed. The invention is claimed to effectively degrade zearalenones, thus preventing zearalenone-induced animal disorders and/or problems, such as infertility, abortion, breeding problems, and uterus and vulva swelling. The process includes using a mediator, such as methylsyringate and phenothiazine-10-propionic acid. The feed products are preferably fermentation by-products and grain-based feeds. Suitable sources of laccases include Polyporus pinisitus, Polyporus versicolor, Myceliophthora thermophila, Rhizoctonia praticola, Rhizoctonia solani and Rhus vernicifera.

Rapid analytical method for the determination of aflatoxins in plant-derived dietary supplement and cosmetic oils.

Mahoney N., Molyneux R.J. *Journal of Agricultural and Food Chemistry* (ISSN : 0021-8561) 2010 (April 14), 58 (7), 4065-4070 (19 ref.) En:en (saan: 804940)

The aim of this study was to develop a method for the determination of aflatoxin in edible oils derived from almonds, pistachios, walnuts, borage, evening primrose and perilla. Oil samples were spiked with aflatoxins at different levels to evaluate the method. None of the blank oils showed the presence of aflatoxins. The method using HPLC and a fluorescence detector will form the basis of an intra- and interlaboratory study to establish a fully validated method for the analysis of aflatoxins in dietary supplements and cosmetics containing plant oils.

Effects of industrial processing on the distributions of deoxynivalenol, cadmium and lead in durum wheat milling fractions.





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Cheli F., Campagnoli A., Ventura V., Brera C., Berdini C., Palmaccio E., dell'Orto V. *Lebensmittel-Wissenschaft und -Technologie (LWT - Food Science and Technology)* (ISSN : 0023-6438) 2010 (September), 43 (7), 1050-1057 (many ref.) En:en (saan: 804833)

The distribution of deoxynivalenol, cadmium and lead in wheat milling fractions as a result of conventional milling and debranning operations was examined in this study. Contamination levels were lower than the limits imposed by the EC. Debranning produced higher contamination levels in products for animal feed, compared with conventional milling. Results indicated that crude fibre is not a good marker for describing the partitioning of contaminants in milling fractions when levels are low.

Screening for mycotoxins in the inoculum used for production of attieke, a traditional Ivorian cassava product.

Kastner S., Kandler H., Hotz K., Bleisch M., Lacroix C., Meile L. *Lebensmittel-Wissenschaft und -Technologie (LWT - Food Science and Technology)* (ISSN : 0023-6438) 2010 (September), 43 (7), 1160-1163 (36 ref.) En:en (saan: 804848)

There is limited information on mycotoxin contamination of attieke, produced using mould-covered cassava tubers. In this study, inoculum and attieke samples were examined for ochratoxin, aflatoxin B1, B2, G1 and G2, and deoxynivalenol (DON) contamination. The effect of samples on *Vibrio fischeri* was also investigated. Trace amounts of ochratoxin A (OTA) were detected in some samples, but no aflatoxin or DON were detected. Extract fractions inhibiting the biological test system were found. The authors suggest that unidentified bioactive microbial metabolites might be present and affect humans.

Aflatoxins and ochratoxin A in pistachios sampled in Spain: occurrence and presence of mycotoxigenic fungi.

Fernane F., Cani-Sancho G., Sanchis V., Marin S., Ramos A.J. *Food Additives and Contaminants B* (ISSN : 1939-3210) 2010 (September), 3 (3), 185-192 (46 ref.) En:en (saan: 804764)

Fungal contamination and the occurrence of aflatoxins and ochratoxin A in 50 pistachio samples obtained from different commercial stores in Spain were investigated. *Aspergillus flavus* was found in 30% of samples, *Aspergillus section Nigri* in 40%, *Aspergillus ochraceus* in 2% and *Penicillium verrucosum* in 26%. A total of 204 fungal isolates were obtained, with 70.8% of *Aspergillus flavus* isolates producing aflatoxins B1 and B2, while

ochratoxin A production was detected in 54.4% of *Aspergillus section Nigri* isolates. Aflatoxins were detected in 5 pistachio samples, all exceeding the maximum EU legal limit established for aflatoxin B1 or for total aflatoxins. Only one pistachio sample exhibited ochratoxin A contamination at 0.67 mcg/kg. Results indicated that the frequency of contamination with aflatoxins and ochratoxin A in pistachio samples available in the Spanish market was relatively low.

Aflatoxin M1 in Spanish infant formulae: occurrence and dietary intake regarding type, protein-base and physical state.

Gomez-Arranz E., Navarro-Blasco I. *Food Additives and Contaminants B* (ISSN : 1939-3210) 2010 (September), 3 (3), 193-199 (25 ref.) En:en (saan: 804765)

Occurrence of aflatoxin M1 (AFM1) in 69 different infant formulae marketed in Spain between 2007 and 2008 was assessed, and dietary intake was estimated. AFM1 was detected in 26 formulae at levels below the permissible limit established by EU legislation, with a mean value of 3.1 ng/kg. Increasing occurrence of AFM1 was observed in infant formulae produced by less complex manufacturing processes affecting the casein/whey protein ratio. Occurrence of AFM1 was 14.3% in preterm formulae, 35.3% in starter formulae, 41.1% in follow-up formulae, and 87.1% in toddler formulae, while hypoallergenic and lactose-free formulae were totally AFM1-free. Occurrence of AFM1 was also influenced by the main protein source and physical state of formulae. Dietary weekly intake of AFM1 was about 1 ng/kg body weight for standard formula and 0.1 ng/kg body weight for preterm formula.

Determination of fumonisin B1 in botanical roots by liquid chromatography with fluorescence detection: single-laboratory validation.

Oles C.J., Trucksess M.W. *Journal of AOAC International* (ISSN : 1060-3271) 2010 (July-August), 93 (4), 1155-1160 (20 ref.) En:en (saan: 804473)

This paper describes a single-laboratory validation procedure for determining the accuracy, repeatability and reproducibility of a published method for measuring levels of fumonisin B1 in the botanical root products, ginger, ginseng, black cohosh, Echinacea, valerian, dong quai and turmeric. The method involved the use of reverse-phase liquid chromatography with fluorescence detection. All the products were found to contain less than 10 ng/g of fumonisin B1. It was concluded that the method met the AOAC performance standards for the products tested.





Determination of deoxynivalenol in processed foods.

Trucksess M.W., Bao L., Weaver C.M., White K.D. *Journal of AOAC International* (ISSN : 1060-3271) 2010 (July-August), 93 (4), 1236-1242 (17 ref.) En:en (saan: 804476)

Deoxynivalenol (DON) or vomitoxin is a mycotoxin commonly found in wheat, although cleaning prior to milling and food processing can reduce toxin levels. This paper describes a reverse-phase liquid chromatographic method for the determination of DON in processed wheat foods, such as pasta, bread, crackers, pretzels and breakfast cereals. Use of the method resulted in recoveries of DON of greater than 70% in processed foods spiked at levels from 0.5 to 1.5 mcg/g.

Method for reducing afla- and ochratoxin contamination in cereals, nuts, fruits and spices.

Bayer Cropscience AG Meissner R., Hauser-Hahn I., Wieczorek K. *European Patent Application 2 227 086* (European Patent Office) (29.11.2007) En:en 20.11.2008 (saan: 804317)

An improved method of reducing contamination of cereal, nut, fruit and spice plants, particularly genetically modified plants, or their parts after harvest or during storage, which involves the use of at least two fungicidally active compounds, is disclosed. The invention is claimed to effectively control fungal infections in plants, thus lowering the level of aflatoxins and ochratoxins. The compounds, which preferably belong to the azole or strobilurin groups, or other fungicide groups, can be applied to the plant or plant part, such as the shoot, flower, leaf, root and blossom, or to the soil.

Method for reducing mycotoxin contamination in maize.

Bayer Cropscience AG Meissner R., Hauser-Hahn I., Kausmann M., Tietjen K., Wieczorek K., Schreier P., Suty-Heinze A. *European Patent Application 2 224 811* (European Patent Office) (29.11.2007) En:en 15.11.2008 (saan: 804294)

An improved method for effectively reducing mycotoxin contamination of plant material, such as maize, using at least one fungicidally active compound is disclosed. The invention may be performed prior to or after harvest and/or during storage by applying the compound to the plant, seed or fruit or to the soil. The fungicide is selected from Cyproconazole, Flusilazole, Epoxiconazole, Propiconazole, Ipconazole, Prothioconazole, Tebuconazole, Metconazole and Triadimenol. The method is particularly suitable for materials obtained from genetically modified plants.

Effect of sample size in the evaluation of 'in-field' sampling plans for aflatoxin B1 determination in corn.

Brera C., de Santis B., Prantera E., Debegnach F., Pannunzi E., Fasano F., Berdini C., Slate A.B., Miraglia M., Whitaker T.B.

Journal of Agricultural and Food Chemistry (ISSN : 0021-8561) 2010 (August 11), 58 (15), 8481-8489 (18 ref.) En:en (saan: 804183)

The performance of sampling plan designs to determine aflatoxin B1 contamination in corn fields was examined in this study. An equation associated with the normal distribution was used to estimate the variability and confidence intervals associated with sample means of a given size. Operating characteristic curves were developed using the distribution information obtained, to evaluate the performance of the different sampling plan designs.

Mycotoxins in food and feed. Actual multimethods for different requirements.

Lutjohann J.

Deutsche Lebensmittel-Rundschau (ISSN : 0012-0413) 2010 (September), 106 (9), 470 (0 ref.) De (saan: 804131)

This article looks at analytical methods for detection and determination of mycotoxins in human and animal foods. The formation and occurrence of mycotoxins is briefly discussed and different types are identified, including aflatoxins, ochratoxins, Fusarium toxins and patulin. German and EU legal requirements for permitted levels are highlighted. Sampling and preparation techniques are outlined, as well as sample processing and measurement, extraction, clean up and fortification methods. The use of thin-layer chromatography, gas chromatography, HPLC and ELISA methods are then discussed.

Mycotoxins in spices. Validated methods for simultaneous determination of Aflatoxins and Ochratoxin A in paprika and chilli spices.

Barricelli M., Kupfer R., Borner B.

Deutsche Lebensmittel-Rundschau (ISSN : 0012-0413) 2010 (September), 106 (9), supplement 'Lebensmittel Analytik', 2010 (September), 61-65 (0 ref.) De (saan: 804139)

This article looks at methods for simultaneous determination of Aflatoxins and Ochratoxin A in paprika and chilli spices imported into Germany. The nature and occurrence of mycotoxins is highlighted, along with EU regulations. Analytical methods are then outlined and discussed, focusing on the use of HPLC-MS/MS and HPLC-FLD.

Comparison of monoclonal antibody performance characteristics for the detection of





two representatives of A- and B-trichothecenes: T-2 toxin and deoxynivalenol.

Baumgartner S., Fuhrer M., Krska R.
World Mycotoxin Journal (ISSN : 1875-0710) 2010 (August), 3 (3), 233-238 En:en (saan: 804017)
 Trichothecene mycotoxins are produced by species of *Fusaria* in cereal crops. Types A and B trichothecenes differ slightly in molecular structure, but type A trichothecenes, such as T-2 toxin, and type B trichothecenes, such as deoxynivalenol, can co-occur. The aim of this study was to develop a cell culture procedure for the production of specific monoclonal antibodies for T-2 toxin and deoxynivalenol. These were further characterised and the stability, solvent resistance properties and cross-reactivities (in particular to other trichothecene mycotoxins, such as HT-2 toxin and 3-acetyldeoxynivalenol) were determined.

Multiresidue mycotoxin analysis in wheat, barley, oats, rye and maize grain by high-performance liquid chromatography-tandem mass spectrometry.

Martos P.A., Thompson W., Diaz G.J.
World Mycotoxin Journal (ISSN : 1875-0710) 2010 (August), 3 (3), 205-223 En:en (saan: 804015)
 The aim of this study was to develop a method for the simultaneous determination of mycotoxins (including aflatoxins, sterigmatocystin, cyclopiazonic acid, trichothecenes, ochratoxin A, fumonisins, zearalenone and ergot alkaloids) in cereal grains (wheat, barley, oats, rye and maize). Aqueous acetonitrile was used as extractant in a commercial sample preparation apparatus, prior to centrifugation, filtration and analysis by liquid chromatography-electrospray ionisation tandem mass spectrometry (LC-ESI-MS/MS). The extraction method was adjusted for optimum extraction of fumonisins. Method performance characteristics are reported: accuracy, repeatability and ruggedness. Detection limits were less than the current maximum Canadian residue limits, and the majority of matrix effects were in the region of 100%. The method was successfully applied to the determination of mycotoxins in certified proficiency samples and 100 field samples of grains. The authors report mycotoxins in all matrices, including ergotamine in winter wheat.

HPLC method for simultaneous detection of aflatoxins and cyclopiazonic acid.

Soares C., Rodrigues P., Freitas-Silva O., Abrunhosa L., Venancio A.
World Mycotoxin Journal (ISSN : 1875-0710) 2010 (August), 3 (3), 225-231 En:en (saan: 804016)
 Both aflatoxins and cyclopiazonic acid can be produced by the species *Aspergillus flavus*, and analyses for these mycotoxins have been used for

identification of this species. In this study a simple HPLC method for the simultaneous detection of these mycotoxins was developed. Chromatographic and postcolumn photochemical derivatisation conditions are presented, and detection was by fluorescence detection. The method was successfully applied to the analysis of standards and 24 fungal extracts of *Aspergillus flavus*.

Varietal differences in accumulation of aflatoxin B1 in Indian rice.

Reddy K.R.N., Reddy C.S., Salleh B.
World Mycotoxin Journal (ISSN : 1875-0710) 2010 (August), 3 (3), 251-256 En:en (saan: 804019)
 Field and storage conditions can lead to the colonisation of rice (paddy) seeds with *Aspergillus flavus* and subsequent contamination with aflatoxins. The aim of this study was to evaluate the differences in 30 Indian rice cultivars (15 normal and 15 basmati) for accumulation of aflatoxin B1 following inoculation with aflatoxigenic *Aspergillus flavus*. The accumulation of aflatoxin B1 was found to be higher in normal cultivars than in basmati, and ranged from 3 to 628 mcg/kg in normal rice and 0.2 to 7.2 mcg/kg in basmati rice cultivars. The total phenolic content of rice bran of the cultivars is presented for normal rice (1.96-2.45 mg gallic acid equivalent/g of bran) and basmati rice (2.13-2.65 mg gallic acid equivalent/g of bran).

Mycotoxins in grapes and wine in Europe: occurrence, factors affecting the occurrence and related toxicological effects.

Stratakou I., van der Fels-Klerx H.J.
World Mycotoxin Journal (ISSN : 1875-0710) 2010 (August), 3 (3), 283-300 En:en (saan: 804022)
 This paper presents a review of the mycotoxin contamination in grape products and wine in Europe over the previous 15 years and data from these 15 years were presented as three groups. The majority of contamination data was on ochratoxin A which was higher in southern Europe than in the north, and in red and sweet wines compared to white wines. Low levels of fumonisins are reported, and no data was available on the occurrence of *Alternaria* toxins. Factors affecting the contamination of grapes and wine with ochratoxin A are discussed, such as temperature and relative humidity prior to harvest, wine type (maceration) and percentage of damaged berries. The authors present examples of good agricultural practice in the vineyard that can limit mycotoxin formation, but also recommend further research in this area.

Effect of various surfactants (cationic, anionic and non-ionic) on the growth of *Aspergillus*





parasiticus (NRRL 2999) in relation to aflatoxin production.

Tanuja K., Hemalatha K., Karuna R., Rao B.S. *Mycotoxin Research* (ISSN : 0178-7888) 2010 26 (3), 155-170 En:en (saan: 804026)

The aim of this study was to investigate the effects of surfactants on aflatoxin production, ergosterol content and sugar consumption by *Aspergillus parasiticus* in culture. Two cationic (cetyl dimethyl ammonium bromide, CDAB and dodecyl trimethyl ammonium bromide, DTAB), one anionic (sodium dodecyl sulfate, SDS) and three non-ionic surfactants at 0.001, 0.01, 0.1 and 1.0 % concentrations were studied in the investigation. Spore germination was completely inhibited by 0.01% of CDAB, DTAB and SDS, and DTAB also inhibited ergosterol and aflatoxin production. Aflatoxin production was enhanced by treatment with 0.001% CDAB, but SDS inhibited toxin production in comparison with other surfactants. At all concentrations spore germination was delayed up to day 5 by treatment with non-ionic surfactants Tween-20, Brij-35 and Triton X-100, and production of ergosterol and aflatoxin was inhibited by treatment of each of the non-ionic surfactants at 0.001%. Aflatoxin production is maximum at day 7, and Tween-20 was the most effective inhibitor at this point. A correlation between sugar consumption and ergosterol content was observed, which corresponded with aflatoxin production.

Increased sensitivity of *Aspergillus flavus* and *Aspergillus parasiticus* aflatoxin biosynthesis polyketide synthase mutants to UVB light.

Ehrlich K.C., Wei Q., Bhatnagar D. *World Mycotoxin Journal* (ISSN : 1875-0710) 2010 (August), 3 (3), 263-270 En:en (saan: 804021)

Biocompetition, in which spores of non-aflatoxigenic strains are introduced, is one means of reducing aflatoxin contamination of maize and cottonseed. In this study the effect of exposure of conidia of *Aspergillus flavus* and *Aspergillus parasiticus* mutants to UVB light at 302 nm was evaluated. The authors report that non-aflatoxigenic *Aspergillus flavus* and *Aspergillus parasiticus* may have shorter long-term viability than natural aflatoxin-producing isolates on exposure to sunlight.

Evaluation of cultivar susceptibility and storage periods towards aflatoxin B1 contamination on pistachio nuts.

Bensassi F., Rhouma A., Ghrab M., Bacha H., Hajlaouri M.R. *Mycotoxin Research* (ISSN : 0178-7888) 2010 26 (3), 199-203 En:en (saan: 804030)

The aim of this study was to evaluate the effect of storage period on aflatoxin B1 accumulation in

pistachio nuts. Over one crop year a total of 49 samples were collected in Tunisia and analysed by ELISA with immunoaffinity. After two years of storage a significant increase in aflatoxin B1 contamination in the pistachio nuts was observed, with differences between the cultivars: variety Mateur was the most susceptible to aflatoxin B1 contamination. The European Union maximum permitted level of aflatoxin B1 in pistachio nuts is 2 mcg/kg, and levels of aflatoxin B1 found in this survey exceeded this, ranging from 2.7 - 12.7 mcg/kg.

Preliminary exposure assessment of deoxynivalenol and patulin in South Africa.

Shephard G.S., van der Westhulzen L., Katerere D.R., Herbst M., Pineiro M. *Mycotoxin Research* (ISSN : 0178-7888) 2010 26 (3), 181-185 En:en (saan: 804028)

Results of surveillance for the mycotoxins deoxynivalenol and patulin in commercial products in South Africa are reported in this study. Maize meal (n=18) and wheat flours (n=23) were analysed for deoxynivalenol, and apple juices (n=30) were analysed for patulin. Levels of each of the mycotoxins in the different foodstuffs were used to calculate probable daily intakes. Consumption of wheat was estimated to contribute 6-13% of the provisional maximum tolerable daily intake for deoxynivalenol as set by the Joint FAO/WHO Expert Committee on Food Additives (JECFA). The majority of the apple juice samples (n=20) had non-detectable levels of patulin, but the authors report that the highest level of 1,650 mcg/l can lead to a hot spot contamination of over 9,000% of the JECFA provisional maximum tolerable daily intake.

Occurrence of mycotoxins in Southern Europe.

Griessler K., Rodrigues I., Handl J., Hofstetter U. *World Mycotoxin Journal* (ISSN : 1875-0710) 2010 (August), 3 (3), 301-309 En:en (saan: 804023)

The results of a four and a half year survey on the incidence of mycotoxins in animal feed materials from Southern Europe (Portugal, Spain, Italy, Greece and Cyprus) are presented in this paper. An ELISA technique or an HPLC method were used in the analysis of a total of 416 samples for aflatoxins, zearalenone, type B trichothecenes (such as deoxynivalenol and acetyldeoxynivalenol), type A trichothecenes (T-2 toxin and HT-2 toxin), fumonisins and ochratoxin A. Average levels of zearalenone were 27 mcg/kg (by ELISA) and 32.5 mcg/kg (by HPLC), and average levels of fumonisins were 1,411 mcg/kg (by HPLC) and 6,260 mcg/kg (by ELISA) were reported. Other mycotoxins, such as aflatoxins, ochratoxin A and the trichothecenes were detected less frequently and average concentrations





were as follows: aflatoxins 1 mcg/kg (by ELISA) or 3 mcg/mg (by HPLC), ochratoxin A 4 mcg/kg (by HPLC) or 2 mcg/kg (by ELISA), type A trichothecenes 2 mcg/kg (by HPLC) or 18 mcg/kg (by ELISA).

Aflatoxin B1 in chillies from the Punjab region, Pakistan.

Iqbal S.Z., Paterson R.M., Bhatti I.A., Asi M.R., Sheikh M.A., Bhatti H.N.

Mycotoxin Research (ISSN : 0178-7888) 2010 26 (3), 205-209 En:en (saan:804031)

An HPLC method was used in the determination of aflatoxin B1 in whole chillies (n=22) and powdered chillies (n=22) from the Punjab region of Pakistan. Aflatoxin B1 contamination was detected in 73% of whole chillies and 86.4% of powdered chillies. Maximum levels in the powdered chillies were 89.56 mcg/kg and in whole chillies was 96.3%, but mean levels in the powdered chillies were statistically higher than in the whole chillies. Aflatoxin B1 levels were generally higher than the European Union maximum permitted limit, and the authors conclude that there was a need for improvements in chilli production in Pakistan.

Sequential events of apoptosis induced by zearalenone in cultured hepatocarcinoma cells.

Gazzah C., Bennour E.E.G., Bouaziz C., Abid S., Ladjimi M., Bacha H.

Mycotoxin Research (ISSN : 0178-7888) 2010 26 (3), 187-197 En:en (saan: 804029)

An in vitro study is reported in this paper for the investigation of the toxic effects of zearalenone in human hepatocarcinoma (HepG2) cells. Cell viability, heat-shock protein expression, oxidative damage, DNA fragmentation, the cell cycle and the cell-death-signalling pathway were monitored following treatment with zearalenone. A time and dose dependant reduction in cell viability was observed. Induction of the Hsp70 protein and an increase in generation of reactive oxygen species (ROS), DNA fragmentation and cell-cycle arrest were observed as a result of treatment with 100 mcMol of zearalenone. These effects were observed 2 hours after exposure of HepG2 cells to zearalenone and before observed apoptosis, which was significant after at least 30 hours exposure to zearalenone. Apoptosis was associated with increased Bax expression and decreased BCL-2 expression, mitochondrial membrane potential-released cytochrome c and activated caspase-3 and caspase-9.

Ear secondary traits related to aflatoxin accumulation in commercial maize hybrids under artificial field inoculation.

Balconi C., Motto M., Mazzinelli G., Berado N. World Mycotoxin Journal (ISSN : 1875-0710) 2010 (August), 3 (3), 239-250 En:en (saan: 804018)

The resistance to *Aspergillus flavus* and aflatoxin accumulation in 24 maize hybrids was compared in field experiments over 2 years. In addition the relationship of aflatoxin concentration with ear secondary traits was estimated. The inoculation procedure and ear secondary traits, such as silk channel length at pollination and husk coverage are described. Rating scales based on visible kernel infection were used to estimate the severity of fungal attack. Inoculation resulted in higher levels of aflatoxins. The hybrids in the study showed different rates of aflatoxin accumulation: from 0.13 to 705.25 ng/g. Negative correlation of silk channel length at maturity, and a positive correlation of husk coverage rating at maturity with aflatoxin accumulation are reported. In addition, a negative correlation between the two secondary ear traits was observed, and the authors conclude that hybrids with good coverage at the pollination stage are capable of keeping the ear tip covered until maturity thereby reducing the risk of aflatoxin contamination.

A review on comparative data concerning Fusarium mycotoxins in Bt maize and non-Bt isogenic maize.

Ostry V., Ovesna J., Skarkova J., Pouchova V., Ruprich J.

Mycotoxin Research (ISSN : 0178-7888) 2010 26 (3), 141-145 En:en (saan: 804024)

Infestation of maize by the European corn borer has been correlated with increased stalk and ear roots and infection of maize with *Fusarium* species and accumulation of mycotoxins, such as fumonisins, deoxynivalenol and zearalenone. Bt maize is a maize variety carrying the Bt gene that produces the Bt toxin thus causing the plant to be resistant to feeding by the European corn borer larvae. The aim of this study was to compare data from studies (n=23) on the reduction of *Fusarium* mycotoxins in Bt maize. Levels of mycotoxins (fumonisins, deoxynivalenol and zearalenone) were significantly less in the Bt maize than the corresponding control variety in 19 out of the 23 studies evaluated.

Survey and risk assessment of the mycotoxins deoxynivalenol, zearalenone, fumonisins, ochratoxin A, and aflatoxins in commercial dry dog food.

Bohm J., Koinig L., Razzazi-Fazeli E., Blajet-Kosicka A., Twaruzek M., Grajewski J., Lang C.

Mycotoxin Research (ISSN : 0178-7888) 2010 26 (3), 147-153 En:en (saan: 804025)

The aim of this study was to evaluate mycotoxin occurrence in commercial dry dog food and consider





adverse risks. Levels and frequency of deoxynivalenol, zearalenone, fumonisins, ochratoxin A and aflatoxins were determined in 76 samples of dog food from 27 different producers. Commercial ELISA test kits were used for analysis, with HPLC and immunoaffinity column cleanup for confirmation. Good correlations between ELISA and HPLC deoxynivalenol and zearalenone results were obtained, indicating that ELISA can be a simple, cheap and sensitive screening tool for these mycotoxins in dry dog food. A total of 83% of samples were contaminated with deoxynivalenol at levels up to 1,390 mcg/kg, 47% of samples were contaminated with zearalenone at levels up to 298 mcg/kg and 42% of samples were contaminated with fumonisins at levels up to 568 mcg/kg. Ochratoxin A was only detected in 5% of samples and none of the samples had detectable levels of aflatoxins.

Estimating deoxynivalenol contents of wheat samples containing different levels of Fusarium-damaged kernels by diffuse reflectance spectrometry and partial least square regression.

Beyer M., Pogoda F., Ronellenfitsch F.K., Hoffmann L., Udelhoven T.

International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (September), 142 (3), 370-374 (22 ref.)

En:en (saan: 803856)

Deoxynivalenol is a mycotoxin associated with kernel-damaged grain, which can have implications for human health. Visual assessment of disease severity can provide an indication of the potential level of contamination with deoxynivalenol, but this can lead to misjudgement of grain quality. The results of this study indicated that estimating deoxynivalenol contents from spectrometric data, rather than by visual grading, reduced the level of unexplained variance by 35%. It is proposed that the spectral data takes account of the level of contamination of the damaged kernels, particularly at wavelengths above 1100 nm.

Water activity and temperature effects on mycotoxin production by *Alternaria alternate* on a synthetic tomato medium.

Pose G., Patriarca A., Kyanko V., Pardo A., Pinto V.F.

International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (September), 142 (3), 348-353 (33 ref.) En:en (saan: 803852)

Alternaria contamination in agricultural products can lead to the presence of mycotoxins, which could result in adverse effects on health. The aim of this study was to assess the effects of water activity and temperature on the production of mycotoxins (alternariol, alternariol monomethyl ether and

tenuazonic acid) by *Alternaria* in tomatoes. The study used a synthetic tomato medium, which was prepared with different levels of water activity, inoculated with *Alternaria* and stored at 6, 15, 21 or 35 C. It was found that highest amounts of alternariol were produced at 21 C for all water-activity levels; highest amounts of alternariol monomethyl ether were produced at 35 C and 0.954 water activity; and optimum conditions for tenuazonic acid production were 0.982 water activity and 21 C. these results indicate that higher water activity levels and temperatures above 6 C favour mycotoxin production. The authors consider the information useful for assessing the risk of mycotoxin contamination in tomatoes, and suggest the avoidance of decaying tomatoes in processing plants.

Aflatoxin M1 in raw milk in Croatia.

Bilandzic N., Varenina I., Solomun B. Food Control (ISSN : 0956-7135) 2010 (September), 21 (9), 1279-1281 (22 ref.) En:en (saan: 803840)

Results of this study showed that mean concentrations of aflatoxin M1 in raw milk in Croatia were 18.4 ng/l ng/l (with a maximum of 35.8-58.6 ng/l) during the months January to April, and 4.2 ng/l (with a maximum of 11.5-14.9 ng/l) during the months June, July and September. The highest concentration (58.6 ng/l), which exceeded the maximum permitted value, was observed in February, and a total of 1.64% of samples (n=61) exceeded the maximum level stated in EU legislation. The authors consider that the extent of aflatoxin M1 contamination in Croatian milk is low, with 98.4% of milk samples having levels below maximum tolerance level.

Occurrence of ochratoxin A before bottling in DOC and DCG wines produced in Piedmont (Northern Italy).

Spadaro D., Lore A., Garibaldi A., Gullino M.L. Food Control (ISSN : 0956-7135) 2010 (September), 21 (9), 1294-1297 (19 ref.) En:en (saan: 803843)

This paper reports on the incidence of ochratoxin A (OTA) in Piedmontese red and white wines designated as Appellation of Controlled Origin (DOC) and Appellation of Controlled and Guaranteed Origin (DOCG) and produced between 2000 and 2007. Wine for analysis was taken from tanks just prior to bottling. The incidence of ochratoxin A was significantly higher in red wine (0.121 mcg/l) than in white wine (0.086 mcg/l) and, amongst the white wines, was significantly lower in Moscato wines. Higher numbers of positive samples were observed in 2000, 2003, 2006 and 2007, which the authors propose could be correlated with intense rain and high temperatures during the harvest season in



those years. They also suggest constant monitoring of black aspergilli in vineyards as a means of reducing levels of ochratoxin A in wine.

Effect of Capsicum carotenoids on growth and ochratoxin A production by chilli and paprika Aspergillus spp. isolates.

Santos L., Kasper R., Gil-Serna J., Marin S., Sanchis V., Ramos A.J.

International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (September), 142 (3), 354-359 (36 ref.) En:en (saan: 803853)

It is reported that some species of Aspergillus, including those capable of producing ochratoxin A (OTA) have been found in paprika and chilli samples. Certain carotenoids found in paprika and chillies have been shown to exhibit activity against mycotoxigenic moulds, but information is limited. The aim of this study was to assess the effects of capsantal on the growth and OTA-producing capacity of Aspergillus ochraceus, Aspergillus westerdijkiae and Aspergillus tubingensis isolated from paprika or chilli. Results indicated that Aspergillus tubingensis had the highest growth rate, with maximum growth at 25 C and maximum ochratoxin A production at 15 C (no growth was observed at 10 C). Aspergillus westerdijkiae was the major producer of ochratoxin A. At 25 C, capsantal reduced growth rates. The authors observe that the effects of capsantal on production of ochratoxin A were inconclusive, owing to the influence of other intrinsic and extrinsic factors.

Determination of masked mycotoxins in cereals and cereal based foods.

Food Standards Agency

FSAeNews 2010 September 6 (0 ref.) (saan: : 803447)

Mycotoxins can be produced by moulds growing on food and agricultural products and metabolism within living plants as well as processing, such as cooking, baking and brewing, can result in the formation of mycotoxin conjugates. Analytical methods, based on LC-MS/MS detection for the detection and quantification of masked mycotoxins formed by Fusarium toxins, such as deoxynivalenol (DON) and zearalenol (ZON) in cereals and cereal-based foods were developed and validated in this study. Two LC-MS/MS methods, based on existing multi-methods, were developed for DON and ZON, and validated in-house. The methods were successfully applied to the determination of free and bound Fusarium mycotoxins in 31 composite of cereal grain and cereal-based food. DON was detected in four samples and ZON was detected in two samples. Twelve samples contained detectable levels of zearalenone-4-sulfate, but no other mycotoxins were

detected in any of the remaining samples. The methods were capable of detecting the following mycotoxins and mycotoxin conjugates: deoxynivalenol, acetyl-deoxynivalenol, deoxynivalenol-3-glucoside, zearalenone-4-glucoside, zearalenone-4-sulfate, alpha-zearalenol, beta-zearalenol, alpha-zearalenol-4-glucoside and beta-zearalenol-4-glucoside.

Influence of package, type of apple juice and temperature on the production of patulin by Byssoschlamys nivea and Byssoschlamys fulva.

Sant'Ana A.S., Simas R.C., Almeida C.A.A., Cabral E.C., Rauber R.H., Mallmann C.A., Eberlin M.N., Rosenthal A., Massaguer P.R.

International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (August 15), 142 (1-2), 156-163 (many ref.) En:en (saan: 803377)

There is limited information on the production of patulin in juice packages by heat-resistant moulds that might survive pasteurisation. The production of patulin by Byssoschlamys spp in cloudy and clarified apple juices was investigated in this study. Juices were packaged in laminated paperboard packages or in PET bottles and stored at different temperatures. The Byssoschlamys strains examined produced patulin in cloudy and clarified apple juices. Maximum levels of patulin recovered from juices are given; lower patulin levels were found with the lower storage temperature. The control of contamination and the incidence of Byssoschlamys nivea and Byssoschlamys fulva are suggested to be a concern for food safety.

Efficacy of chemically characterized Piper betle L. essential oil against fungal and aflatoxin contamination of some edible commodities and its antioxidant activity.

Prakash B., Shukla R., Singh P., Kumar A., Mishra P.K., Dubey N.K.

International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (August 15), 142 (1-2), 114-119 (39 ref.) En:en (saan: 803372)

Fungal contamination of dried fruit, spices and areca nut was investigated in this study, and the essential oil of Piper betle var. magahi was evaluated in terms of its antifungal, antiaflatoxigenic and antioxidant properties. Aspergillus was the dominant genus isolated. Aflatoxin-producing strains of Aspergillus flavus were found, and a minimum inhibitory concentration (MIC) for Piper betle against Aspergillus flavus was determined. The essential oil reduced the production of aflatoxin B1 and showed antioxidant potential. The use of the essential oil as a food additive for improving the shelf life of foods during storage and processing is suggested.





Genes differentially expressed by *Aspergillus carbonarius* strains under ochratoxin A producing conditions.

Crespo-Sempere A., Gonzalez-Candelas L., Martinez-Culebras P.V.

International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (August 15), 142 (1-2), 170-179 (many ref.) En:en (saan: 803379)

Aspergillus carbonarius produces ochratoxin A (OTA), which contaminates grapes, wine, coffee and cocoa. A suppression subtractive hybridisation approach was used in this study to isolate genes differentially expressed in closely related strains of *Aspergillus carbonarius* with different OTA-producing abilities. BlastX analysis identified differentially expressed sequences involved in the production of OTA. Sequence similarities with genes in the NCBI database, and possible functional roles they might play in the production and regulation of OTA are considered. A high percentage of genes was involved in regulation and in the response to stress and detoxification.

First morphomolecular identification of *Penicillium griseofulvum* and *Penicillium aurantiogriseum* toxicogenic isolates associated with blue mold on apple.

Moslem M., Abd-Elsalam K., Yassin M., Bahkali A. Foodborne Pathogens and Disease (ISSN : 1535-3141) 2010 (July), 7 (7), 857-861 En:en (saan: 803315)

Penicillium species are the source of postharvest blue mould decay in fresh apples. The morphological and molecular identification of two new species of *Penicillium* that can cause this disease is reported in this paper. Both *Penicillium griseofulvum* and *Penicillium aurantiogriseum* were isolated from apple fruits and were responsible for decay in storage situations, with *Penicillium griseofulvum* less aggressive than *Penicillium aurantiogriseum*. Isolates from both species were patulin- and citrinin-producing moulds, but different isolates from the same species showed different mycotoxin-production profiles. Differentiation of isolates as species level was carried out by microsatellite-primed polymerase chain reaction, and two genetically different groups were identified.

A 90-d toxicity study of *Monascus*-fermented products including high citrinin level.

Lee C.-H., Lee C.-L., Pan T.-M.

Journal of Food Science (ISSN : 0022-1147) 2010 (June-July), 75 (5), T91-T97 (many ref.) En:en (saan: 803302)

Monascus-fermented red mould rice (RMR) is reported to have cholesterol- and blood pressure-lowering effects, as well as antioxidant effects, but

citrinin is another metabolite with safety concerns. The safety level of citrinin used in *Monascus*-fermented products was established in this study. Different citrinin concentrations in RMR were used. Citrinin did not show nephrotoxicity and hepatotoxicity, and histopathological results did not show significant differences from control histopathological results. A level of citrinin in *Monascus*-fermented products that would not affect liver and kidney functions or cause toxicity is suggested.

In vivo direct patulin-induced fluidization of the plasma membrane of fission yeast *Schizosaccharomyces pombe*.

Horvath E., Papp G., Belagyi J., Gazdag Z., Vagvolgyi C., Pesti M.

Food and Chemical Toxicology (ISSN : 0278-6915) 2010 (July), 48 (7), 1898-1904 (many ref.) En:en (saan: 803189)

The effects of patulin on *Schizosaccharomyces pombe* cells and on the plasma membrane were examined in this study using EPR spectroscopy. Treatment of cells with patulin reduced the phase-transition temperature value of the plasma membrane, with a loss of compounds absorbing light. An adaptation process was found. The authors conclude that the interaction of patulin with the plasma membrane would contribute to the adverse effects induced by patulin.

Mycoflora and fumonisin contamination in Brazilian sorghum from sowing to harvest.

Dos Reis T.A., Zorzete P., Pozzi C.R., da Silva V.N., Ortega E., Correa B.

Journal of the Science of Food and Agriculture (ISSN : 0022-5142) 2010 (July), 90 (9), 1445-1451 (many ref.) En:en (saan: 802917)

This study investigated the mycoflora and fumonisin contamination of fifty samples of sorghum grains from Brazil. All samples were found to be contaminated with fungi, mainly *Cladosporium* and *Helminthosporium*. *Fusarium verticillioides* was isolated from 15.1% of the samples, of which 38% were found to be contaminated with fumonisin B1. A significant correlation was observed between relative air humidity and fumonisin B1 contamination.

Occurrence of *Fusarium* T-2 and HT-2 toxins in oats from cultivar studies in Germany and degradation of the toxins during grain cleaning treatment and food processing.

Schwake-Anduschus C., Langenkamper G., Unbehend G., Dietrich R., Martlbauer E., Munzing K. Food Additives and Contaminants (ISSN : 0265-203X) 2010 (September), 27 (9), 1253-1260 (20 ref.) En:en (saan: 802883)





**European
Mycotoxins Awareness Network**

In the European Union legislative limits on the trichothecenes T-2 and HT-2 toxins have yet to be agreed, but a tolerable daily intake of 0.06 mcg/kg body weight/day have been proposed for combined T-2 and HT-2 toxins. Information on the occurrence and behaviour of these mycotoxins in agricultural produce both before and during food processing procedures is needed before maximum limits for these toxins can be implemented. Four oat cultivars from 10 growing regions in Germany were analysed for T-2 and HT-2 toxins. The grain was processed, and oat meal and bread were prepared. Samples were taken from different steps of the procedure. LC-MS was used in the determination of T-2 and HT-2 toxins and ELISA was used as a screening technique. Concentrations of the toxins from oat samples from all agricultural sites were between 9 and 623 mcg/kg. One site in particular had levels of the toxins six times greater than those from the other sites, and two cultivars (Aragon and Dominik) had higher levels of contamination than the other cultivars. Dehulling was effective in decontamination of the grain (90%), but cleaning did affect levels of the toxins. No further losses in toxins were observed as a result of cooking (as a porridge) or baking.

Influence of barley malting operating parameters on T-2 and HT-2 toxinogenesis of *Fusarium langsethiae*, a worrying contaminant of malting barley in Europe.

Strub C., Pocaznoi D., Lebrihi A., Fournier R., Mathieu F.
Food Additives and Contaminants (ISSN : 0265-203X) 2010 (September), 27 (9), 1247-1252 (32 ref.)
En:en (saan: 802882)

Barley cultivars growing in Europe can be infected with *Fusarium langsethiae*, which produces type A trichothecenes, such as T2 and HT2 toxins. The ecotoxinogenesis of this mould and its health effects in beer manufacturing were evaluated in this study. The effects of temperature and water activity were studied in different cultures grown on sterilised rehydrated barley. PCR was used to quantify biomass specific to *Fusarium langsethiae*, and the mycotoxins T2 and HT2 were determined by LC-MS. The optimal temperature and water activity were 28 C and 0.997 for optimal growth and toxin production, and under optimal conditions 2.22 g/kg of toxins were produced in 16 days. The authors observe that the malting step was a critical step in toxin production from this mould, as the temperature range led to the greatest rate of fungal growth.

Aflatoxin measurements: how HPLC methods have evolved over the last 20 years?

Buttinger G.

Food Additives and Contaminants (ISSN : 0265-203X) 2010 (September), 27 (9), 1266-1272 (14 ref.)
En:en (saan: 802885)

HPLC has been the method of choice in the determination of aflatoxins for a number of years. In this paper a review of the development in HPLC methods over this time is presented, with particular focus on the results of interlaboratory certification studies for peanut meal, peanut butter and animal feed reference materials in the early 1990's, which were repeated in 2009. The author considers evolution of methodology and the impact of standardised methods. Improvements in method performance parameters were assessed, and no significant difference in the results from expert laboratories over the 20 years can be detected.

Determination of aflatoxin M1 in milk by triple quadrupole liquid chromatography-tandem mass spectrometry.

Wang H., Zhou X.J., Liu Y.Q., Yang H.M., Guo Q.L.
Food Additives and Contaminants (ISSN : 0265-203X) 2010 (September), 27 (9), 1261-1265 (32 ref.)
En:en (saan: 802884)

A liquid chromatographic method with tandem mass spectrometric and electrospray positive ionisation detection was developed in this study for the determination of aflatoxin M1 in milk. Acetonitrile was used as an extraction solvent during ultrasonication, prior to SPE column cleanup. Aflatoxin M1 spiked samples were analysed at concentrations between 0.02 and 1 ng/ml and recoveries were in the range 77-94% with RSD of 6%. The detection limit was 0.006 ng/ml and the limit of quantification was 0.02 ng/ml. The authors report that the method is quick, simple, specific and reliable, and suitable for the routine monitoring of aflatoxin M1 in milk.

Ochratoxin A levels in the plasma of healthy blood donors from Valencia and estimation of exposure degree: comparison with previous national Spanish data.

Medina A., Mateo E.M., Roig R.J., Blanquer A., Jimenez M.
Food Additives and Contaminants (ISSN : 0265-203X) 2010 (September), 27 (9), 1273-1284 (many ref.)
En: en (saan: 802886)

Liquid chromatography with fluorescence detection was used in the determination of ochratoxin A (OTA) in blood plasma from 168 blood donors from the Valencia region of Spain. In addition donors were asked to complete a diet questionnaire related to 26 food groups that can possibly be contaminated with OTA. All blood plasma samples contained levels of OTA between 0.15 and 5.71 mcg/l (mean 1.09 mcg/l). Levels of OTA were higher in blood plasma





from men than women, and rank correlation tests and correlation statistics were used to analyse the data. No correlation was found between OTA levels and any of the food groups identified in the questionnaire, and no reason for the variability could be identified. Mean values for calculated daily dietary intake for OTA in the Spanish population were 1.47 and 2.16 ng/kg bw/day, depending on the formula used.

Early detection of *Aspergillus carbonarius* and *A. niger* on table grapes: a tool for quality improvement.

Ayoub F., Reverberi M., Ricelli A., d'Onghia A.M., Yaseen T.

Food Additives and Contaminants (ISSN : 0265-203X) 2010 (September), 27 (9), 1285-1293 (26 ref.) En:en (saan: 802887)

The primary fungal contaminants of table grapes are *Aspergillus carbonarius* and *Aspergillus niger*, both of which can cause black rot and can also produce the mycotoxin ochratoxin A (OTA). In this study a rapid molecular method, based on PCR, for the early detection of these fungi was developed. Species-specific primers were designed based on the polyketide synthases sequences of the two *Aspergillus* that have been identified in the biosynthesis of OTA. The method was successfully applied to the detection of *Aspergillus carbonarius* and *Aspergillus niger* in three varieties and table grapes, both control and inoculated with *Aspergillus* strains. The method is said to be highly specific and sensitive.

Mycotoxins in food: an update for 2010.

Entwisle C.

New Food (ISSN : 1461-4642) 2010 (June), 13 (3), 56-59 (15 ref.) En:en (saan: 802765)

A brief guide presenting an update to research and analytical methods for mycotoxins is presented in this article. Recent discoveries of fungal growth leading to mycotoxin contamination in different matrices is referenced, and the control of fungal contamination by preharvest control, transgenics, postharvest control and biological control are described. Progress in the areas of genomics and proteomics, and in the field of animal feeds is briefly discussed. State of the art in surveillance and monitoring for mycotoxins is presented.

Food-grade antioxidants and antimicrobials to control growth and ochratoxin A production by *Aspergillus section Nigri* on peanut kernels.

Barberis C.L., Astoreca A.L., Dalcerro A.M., Magnoli C.E.

Journal of Food Protection (ISSN : 0362-028X) 2010 (August), 73 (8), 1493-1501 (25 ref.) En:en (saan: 802741)

The effects of food-grade antioxidant butylated hydroxyanisole (BHA) and antimicrobial propyl paraben (PP) on growth and ochratoxin A (OTA) production by *Aspergillus section Nigri* strains on peanut kernels at different water activities and temperatures were investigated. Complete inhibition of *Aspergillus niger* growth was observed with 20 mm/g of BHA at 18 C and water activity of 0.93. No growth of this fungus was seen for 20 mm/g PP at 18 C and water activity of 0.93, 0.95 and 0.98. BHA at 20 mm/g inhibited ochratoxin A production in peanuts by *Aspergillus carbonarius* and *Aspergillus niger* aggregate strains at 18 C and water activity of 0.93. PP completely inhibited ochratoxin A production at 18 C. Results indicated that PP was more suitable than BHA for controlling growth and ochratoxin A production by *Aspergillus niger* in peanuts.

Mycotoxins in food from Jordan: preliminary survey.

Salem N.M., Ahmad R.

Food Control (ISSN : 0956-7135) 2010 (August), 21 (8), 1099-1103 (many ref.) En:en (saan: 802465)

The presence of mycotoxins in different foods consumed in Jordan was examined. Contamination with aflatoxins, ochratoxin A, deoxynivalenol, fumonisins, zearalenone and T-2 toxin was determined using direct competitive ELISA. Ochratoxin A was the predominant mycotoxin; aflatoxins, deoxynivalenol and fumonisins were detected.

Influence of *Planococcus ficus* on *Aspergillus section Nigri* and ochratoxin A incidence in vineyards from Argentina.

Chiotta M.L., Ponsone M.L., A.M. Torres A.M., Combina M., Chulze S.N.

Letters in Applied Microbiology (ISSN : 0266-8254) 2010 (August), 51 (2), 212-218 En:en (saan: 802268)

Planococcus ficus is an infection of grapes that may be involved in the presence of the mycotoxin ochratoxin A (OTA). The effects of *Planococcus ficus* infection in red wine grapes (Merlot, Malbec and Cabernet Sauvignon) on *Aspergillus section Nigri* and OTA contamination were investigated over different harvest seasons. Damaged grapes had higher levels of *Aspergillus* and OTA, with Cabernet Sauvignon variety having the highest OTA content. The presence of *Planococcus ficus* increased the risk of OTA contamination in grapes. Insect control at the preharvest stage may reduce the entry of OTA into the wine production chain.

Water activity and temperature effects on fungal growth and ochratoxin A production by



ochratoxigenic *Aspergillus carbonarius* isolated from Tunisian grapes.

Lasram S., Oueslati S., Valero A., Marin S., Ghorbel A., Sanchis V.

Journal of Food Science (ISSN : 0022-1147) 2010 (March), 75 (2), M89-M97 (43 ref.) En:en (saan: 802195)

It has been shown that *Aspergillus carbonarius* is predominantly responsible for the production of ochratoxin A in grapes cultivated in Southern Europe. This study investigated the effects of various temperatures and water activities on the growth and toxigenicity of *Aspergillus carbonarius* isolated from Tunisian grapes. The optimal growth temperature was found to be 30 C, although maximum toxin production occurred at 15-25 C. Optimal water activity for growth and toxin production was 0.99, which was higher than for isolates derived from Europe and Australia. The authors propose that it could be possible to predict the risk of ochratoxin A contamination in grapes grown in new vineyards at different climates.

Effect of calcium propionate and water activity on growth and aflatoxins production by *Aspergillus flavus*.

Alam S., Shah H.U., Magan N.

Journal of Food Science (ISSN : 0022-1147) 2010 (March), 75 (2), M61-M64 (33 ref.) En:en (saan: 802190)

The presence of aspergillus in animal feeds represents a significant problem for animal and human health, as the organism can grow and produce aflatoxins. This study investigated the effect of calcium propionate on the growth and aflatoxin-producing ability of *Aspergillus flavus* in media with different levels of water activity. It found that calcium propionate caused moderate inhibition of *Aspergillus flavus*, so that the organism was capable of producing aflatoxins in the presence of this antimicrobial agent, particularly in media with high water activity. At low water activity, calcium propionate was effective in retarding the growth of *Aspergillus flavus*. The authors propose a combination of calcium propionate and modification of water activity as a strategy for suppressing *Aspergillus flavus* growth and aflatoxin production.

Value-added processing of peanut meal: aflatoxin sequestration during protein extraction.

Seifert L.E., Davis J.P., Dorner J.W., Jaynes W.F., Zartman R.E., Sanders T.H.

Journal of Agricultural and Food Chemistry (ISSN : 0021-8561) 2010 (May 12), 58 (9), 5625-5632 (35 ref.) En:en (saan: 802029)

Enzymic hydrolysis of peanut meal dispersions was examined in this study to improve protein extraction

efficiency. The efficacy of a bentonite clay (AB20A) to sequester aflatoxin from contaminated peanut meal was investigated. The capacity of AB20A to sequester aflatoxin was measured. A process designed to sequester aflatoxin from contaminated peanut meal is described. The authors suggest that derivatives of peanut meal can be used in enhanced food/feed applications.

Determination of ochratoxin A in liquorice root using HPLC-FLD after cleaning with immunoaffinity columns.

Barricelli M., Schmidt K., Borner B.

Deutsche Lebensmittel-Rundschau (ISSN : 0012-0413) 2010 (August), 106 (8), 431-433 (10 ref.) De:en (saan: 801917)

This paper outlines a method for the determination of ochratoxin A in liquorice root using high performance liquid chromatography with fluorescence detection after solid phase extraction using immunoaffinity columns. Unwanted matrix interference was eliminated by treatment of the extract with dichloromethane prior to immunoaffinity column clean-up.

Foodstuffs. Determination of ochratoxin A in cereal based foods for infants and young children. HPLC method with immunoaffinity column cleanup and fluorescence detection. BS EN 15835:2010.

British Standards Institution ISBN : 978-0-580-63016-3 2010 22pp En (saan: 801594)

An HPLC method is described for the determination of ochratoxin A in cereal-based foods intended for infants and young children. The method involves immunoaffinity column cleanup and fluorescence detection.

Foodstuffs. Determination of zearalenone in maize based baby food, barley flour, maize flour, polenta, wheat flour and cereal based foods for infants and young children. HPLC method with immunoaffinity column cleanup and fluorescence detection. BS EN 15850:2010.

British Standards Institution ISBN : 978-0-580-64288-3 2010 22pp En (saan: 801593)

An HPLC method is described for the determination of zearalenone in cereal-based foods and young children. The method is suitable for use with products made from barley flour, corn flour, polenta and wheat flour, and is effective in detecting levels of zearalenone of 9 mcg/ml. The method involves immunoaffinity column cleanup and fluorescence detection.

Foodstuffs. Determination of aflatoxin B1 in cereal based foods for infants and young





children. HPLC method with immunoaffinity column cleanup and fluorescence detection. BS EN 15851:2010.

British Standards Institution ISBN : 978-0-580-64289-0 2010 18pp (saan: 801590)

An HPLC method is described for the determination of aflatoxin B1 in cereal-based foods intended for infants and young children. The method involves immunoaffinity column cleanup and fluorescence detection.

Occurrence of patulin in apple-based-foods in Portugal.

Barreira M.J., Alvito P.C., Almeida C.M.M. Food Chemistry (ISSN : 0308-8146) 2010 (August 1), 121 (3), 653-658 (30 ref.) En:en (saan: 801458)
 Apples and apple products are reported to be excellent substrates for the growth of fungi (such as *Penicillium expansum*) that produce patulin, a mycotoxin that can cause chronic health problems in humans. The EU has set regulatory limits for levels of patulin in apple products, such as apple juice and apple puree, in order to protect infants and children from over exposure to this toxin. The limit of 10 mcg/kg requires a sensitive method for analysing patulin in apple-based foods, and this study investigated the use of solid-phase microextraction (SPME) in combination with HPLC and UV detection. A total of 144 apple-based foods were analysed. Patulin was detected in 67% of cloudy apple juices, compared with 13% of clear juices; and 20% of organic products were positive, compared with 24% of conventionally produced products. Analyses of infant products found that none of the drinks contained the mycotoxin, whereas 7% of homogenised apple puree products were contaminated. All levels were below the legislated values.

Immunoaffinity column for detection of deoxynivalenol, zearalenone, T2 toxin and HT2 toxin.

Bevis S.J. UK Patent Application 2 466 536 GB (25.8.2009) En:en (saan: 800979)
 A multi-analyte column for immunological screening of environmentally occurring toxins in a sample, such as a beverage, food product and feed, is disclosed. The invention is claimed to be capable of analysing a sample to detect zearalenone, deoxynivalenol, T-2 and HT-2 toxins. It consists of a resin consisting of an antibody with specificity for deoxynivalenol, a second resin consisting of an antibody with specificity for zearalenone and a third resin consisting of an antibody with specificity for T-2 and HT-2. Suitable samples include wheat, oats, barley, beer, malt-based drinks and baby food. A method of using the immunoaffinity column is also disclosed.

Genotoxic and antimutagenic activities of extracts from pseudocereals in the Salmonella mutagenicity assay.

Mosovska S., Mikulasova M., Brindzova L., Valik L., Mikusova L.

Food and Chemical Toxicology (ISSN : 0278-6915) 2010 (June), 48 (6), 1483-1487 (37 ref.) En:en (saan: 800885)

Pseudocereals, such as amaranth, quinoa and buckwheat, are important sources of antioxidants, and produce a starchy gluten-free grain. The mutagenicity of extracts of amaranth (*Amaranthus L.*), sorghum (*Sorghum bicolor L.*) and Japanese millet (*Echinochloa frumentacea L.*) in *Salmonella typhimurium* strains TA98, TA100 and TA102. In addition the antimutagenic activity of the extracts against direct mutagens for these strains was assessed. Amaranth demonstrated the greatest inhibition of number of revertants induced by hydrogen peroxide, followed by Japanese millet and sorghum, and all extracts demonstrated antimutagenicity to aflatoxin B1. Levels of total polyphenols, flavonoids and phenolic acids are reported.

Individual fumonisin exposure and sphingoid base levels in rural populations consuming maize in South Africa.

van der Westhuizen L., Shephard G.S., Rheeder J.P., Berger H.-M.

Food and Chemical Toxicology (ISSN : 0278-6915) 2010 (June), 48 (6), 1698-1703 (33 ref.) En:en (saan: 800902)

Consumption of high-levels of fumonisin-contaminated maize has been associated with a risk of oesophageal cancer, and high incidence rates have been identified in parts of South Africa. The fumonisin exposure levels in regions of low and high incidences of oesophageal cancer were assessed by quantification of individual maize consumption with weighed food records and determination of fumonisin B levels in maize. To establish possible biomarkers of FB exposure were ratios of sphinganine (Sa) and sphingosine (So) in plasma and urine were determined. The consumption of home-grown maize was high in two areas of the country and the mean fumonisin exposure levels were calculated based on individual consumption to be 3.9 +/- 7.3 and 4.1 +/- 7.6 mcg/kg body weight/day. No correlation between sphingoid base levels, Sa/So ratios or fumonisin exposure was observed, and the authors conclude that sphingoid bases could not be used as biomarkers for fumonisin exposure in humans.





Perspectives for geographically oriented management of Fusarium mycotoxins in the cereal supply chain.

van der Fels-Klerx H.J., Booij C.J.H.
Journal of Food Protection (ISSN : 0362-028X) 2010 (June), 73 (6), 1153-1159 (54 ref.) En:en (saan: 800860)

Certain Fusarium species that infect crops can produce deoxynivalenol. Weather and agronomic practices influence the risks of infection and farmers use a variety of risk management strategies (including HACCP) to minimise the risks of crop infection. This article provides an overview of new systems for management of Fusarium mycotoxins in the cereal grain supply with an emphasis on predictive mathematical models. Good agricultural practice, good manufacturing practices, HACCP and checking and notification systems are summarised. Predictive models for the risks of Fusarium head blight based on local geography and weather conditions are discussed. The authors discuss how these data may be used in mathematical models to predict the risks of FHB in local environments and help farmers decide on the most appropriate actions depending on the risks. Examples of systems that are in operation in the US, Canada and the UK are given.

Determination of deoxynivalenol in infant cereal by immunoaffinity column clean-up and high-pressure liquid chromatography-UV detection.

Dombrink-Kurtzman M.A., Poling S.M., Kendra D.F.
Journal of Food Protection (ISSN : 0362-028X) 2010 (June), 73 (6), 1073-1076 (20 ref.) En:en (saan: 800847)

An analytical method based on aqueous extraction, immunoaffinity column clean up and HPLC with UV detection is described for the determination of deoxynivalenol in infant cereal foods. The limit of quantification was 10 ppb. In a survey of 52 cereal-based infant foods, only one of the samples exceeded 200 ppb.

Comparison of two clean up techniques in isolation of ochratoxin A from red wine.

Belajova E., Rauova D.
Czech Journal of Food Sciences (ISSN : 1212-1800) 2010 28 (3), 233-241 (18 ref.) En:en (saan: 800838)

Comparison of the performance of two clean-up methods (immunoaffinity column (IAC, Ochraprep) and solid phase extraction (SPE) using a laboratory produced column and a commercial column Envi-Carb) during the determination of ochratoxin A (OTA) in red wine is discussed. The results indicate that a SPE column based on carbon adsorbents (particularly activated carbon) is a promising alternative to use of the more expensive IAC in OTA

analysis. The liquid chromatography fluorescence detection method is claimed to have a limit of detection of about 0.01 mcg/l.

Methods for coffee cherry products.

VDF FutureCeuticals Inc. Miljkovic D., Duell B., Miljkovic V. United States Patent 7 754 263 US (17.12.2009) En:en (saan: 800775)

A method of processing coffee cherries to yield a product having an extremely low concentration of mycotoxins is described. The invention uses sub-ripe coffee cherries to reduce the likelihood of mould and fungi infestation, as well as yield a product with desirable levels of flavour and high levels of nutrients. Sub-ripe coffee cherries are hand-picked, quick-dried, comminuted, then contacted to a solvent to produce an extract incorporating desirable levels of nutrients such as polysaccharides, caffeine, polyphenols, and polysaccharides. The resulting extract does not easily spoil in the presence of microorganisms that produce mycotoxins, such as moulds and fungi. The invention is suitable for preparing beverage products such as a tea, juice, and a carbonated beverage.

Determination of ochratoxin A in traditional Chinese medicinal plants by HPLC-FID.

Yang L., Wang L., Pan J., Xiang L., Yang L., Logrieco A.F.
Food Additives and Contaminants (ISSN : 0265-203X) 2010 (July), 27 (7), 989-997 (28 ref.) En:en (saan: 800721)

Traditional Chinese medicinal plants can be used as spices or additives in food products. The aim of this study was to develop a method for the determination of ochratoxin A (OTA) in traditional Chinese medicinal plants and to evaluate contamination levels. Cleanup of methanol/water extracts was by immunoaffinity column and OTA was determined by HPLC with fluorescence detection and LC-ESI-MS/MS confirmation of positive samples. The limit of detection was 0.3 mcg/kg. The method was successfully applied to the analysis of 57 samples of traditional Chinese medicinal plants: a total of 24 samples were contaminated with ochratoxin A in the range 1.2 - 158.7 mcg/kg.

Evaluation of fumonisin biomarkers in a cross-sectional study with two high-risk populations in China.

Xu L., Cai Q., Tang L., Wang S., Hu X., Su J., Sun G., Wang J.-S.
Food Additives and Contaminants (ISSN : 0265-203X) 2010 (August), 27 (8), 1161-1169 (36 ref.) En:en (saan: 800722)

A cross-sectional study of 77 adults in two different regions of China is reported in this paper. The



fumonisin B1 (FB1) intake, via contaminated home-produced corn, was high (greater than 2 mcg/kg body weight) in both these regions (93.0% and 52.9%). There was no correlation of FB1 dietary exposure with sphinganine (Sa) or sphingosine (So) levels or Sa/So ratio. Urinary Sa/So ratio and urinary-free FB1 were determined and the results from adults in the different regions were compared. There was a significant difference in the median level of urinary-free FB1 between the two regions and the authors propose the use of urinary-free FB1 as a biomarker for human fumonisin exposure, and they recommend further studies.

Statement on recent scientific information on the toxicity of ochratoxin A.

Anon.

EFSA Journal 2010 (June), 8 (6), 1626-1633 En:en (saan: 800723)

The Panel on Contaminants in the Food Chain (CONTAM) of the European Food Safety Authority (EFSA) has issued a statement on recent scientific evidence on the toxicity of ochratoxin A. The information consisted of five publications submitted to the European Commission. The possibility of co-exposure of ochratoxin A and aristolochic acid in people from the Balkan region, where Balkan Endemic Nephropathy was prevalent, was discussed in four of the publications. One paper presented a method of analysis for multiple mycotoxins and data on mycotoxins in French breakfast cereals. The Panel reported that the overall assessment of the risks related to food contamination with ochratoxin A was not affected by the information provided, and they conclude that it was not necessary to change the opinion on ochratoxin A.

Aflatoxins in food samples of the Austrian market: assessment of consumer exposure.

Rauscher-Gabernig E., Mischek D., Stimitzer T., Grossgut R.

Ernahrung (ISSN : 0250-1554) 2010 (April), 34 (4), 149-157 (29 ref.) De:en (saan: 800688)

This article reports on a study of 1,064 food samples carried out in Austria between 2003 and 2007 to analyse for aflatoxins B1, B2, G1 and G2. Aflatoxins were detected in 17% of samples, with Aflatoxin B1 most frequently found, ahead of G1. Consumer exposure was evaluated using median aflatoxin concentrations and average consumption levels for foods. Estimated mean intake for all aflatoxins in the study was 1.1-2 ng per kg for preschoolers and adults.

Determination of deoxynivalenol and its acetylated derivatives in maize using stable isotope dilution assays.

Asam S., Rychlik M.

Ernahrung (ISSN : 0250-1554) 2009 (November), 33 (11), 458-463 (11 ref.) En:en (saan: 800682)

This study analysed maize products for the extent of contamination with deoxynivalenol (DON), 3-acetyldeoxynivalenol (3-Ac-DON) and 15-acetyldeoxynivalenol (15-Ac-DON) using stable isotope dilution assays. All samples contained DON and 15-Ac-DON, but no 3-Ac-DON. The relative contribution of 15-Ac-DON to total DON contamination was found to be around 23% and it was suggested that a cumulative value for both DON and the acetylated derivatives should be used when evaluating whether a product is within the legal limit.

Patulin in Austrian foods: assessment of consumer exposure.

Rauscher-Gabernig E., Grossgut R., Stimitzer T.

Ernahrung (ISSN : 0250-1554) 2009 (January), 33 (1), 5-12 (37 ref.) De:en (saan: 800675)

This study examined 164 samples of fruit juices and 70 samples of baby food in Austria over the 2003 to 2007 period for the presence of patulin. Quantifiable amounts were found in 38% of apple juice samples and 24% of grape juice samples. Patulin was not detected in 97% of baby food samples. Estimated exposure levels for consumers with average and high fruit juice consumption were carried out for different age groups. Intake was found to be well below the maximum limit for all population groups.

Single laboratory validated HPLC methods for determination of ochratoxin A, fumonisin B1 and B2, zearalenone and deoxynivalenol in cereals and cereal based foods.

Belajova E., Rauova D.

Journal of Food and Nutrition Research (ISSN : 1336-8672) 2010 49 (2), 57-68 (38 ref.) En:en (saan: 800501)

This study aimed to optimise the analytical methods for the determination of ochratoxin A, fumonisins B1 and B2, zearalenone and deoxynivalenol in cereals and cereal-based foods. Extraction with solvent and clean-up using immunoaffinity columns were used to optimise the method, which involved reverse-phase HPLC with fluorescence detection and ultraviolet diode array detection. The resulting methods exhibited good sensitivity, accuracy and a precision comparable with that of previously published methods.

Natural occurrence of deoxynivalenol in kernels of wheat grown in Slovakia during 2004-2008.

Sudjova V., Slikova S., Gregova E.

Journal of Food and Nutrition Research (ISSN : 1336-8672) 2010 49 (2), 89-93 (17 ref.) En:en (saan: 800505)





This study investigated the deoxynivalenol (DON) contamination of a number of wheat samples grown in nine different locations in Slovakia between 2004 and 2008. Analysis, carried out using ELISA, revealed that, of the 184 wheat samples investigated, 10.3% were contaminated with DON at levels exceeding those acceptable within the EU. A positive correlation was noted between DON content and rainfall, and both year and location had a significant effect on the degree of DON contamination.

Micro-facts: the working companion for food microbiologists.

Wareing P., Stuart F., Fernandes R., Leatherhead, RSC Publishing, 2010 (ISBN : 978-1-905224-84-5) 437pp En (saan: 800263)

The book represents an updated edition of this guide to recent research in the field of food microbiology. A section on foodborne bacterial pathogens covers methods (including rapid methods) for the detection and enumeration of pathogens and provides an overview of the incidence and control of the major organisms involved in outbreaks of foodborne diseases. The expanded section on spoilage microorganisms provides information on bacteria, fungi (particularly mycotoxin-producing moulds) and yeasts. Potential hazards in food production are discussed and guidance is given on the use of HACCP and EU food hygiene legislation. Addresses are provided for suppliers of laboratory media and equipment; and a useful glossary of terms is included.

EU food hygiene legislation.

Wareing P., Stuart F., Fernandes R. Micro-facts: the working companion for food microbiologists. Wareing P., Stuart F., Fernandes R. Leatherhead, RSC Publishing, 2010 (ISBN : 978-1-905224-84-5) 379-398 (0 ref.) (saan: 800283)

Hygiene plays an important role in ensuring food safety, and this chapter outlines legislation related to hygiene in the food industry. It observes that the key aim of European food legislation is to ensure that safe and quality food products can be traded within the EU. The general principles; framework of current EU food hygiene legislation; general hygiene rules; HACCP and hygiene rules for products of animal origin; EU regulation on microbiological criteria, including food safety criteria and process hygiene criteria, and rules for sampling and preparation of test samples; and directives relating to water and mycotoxin levels in food. A table showing food safety criteria for ready-to-eat food is included.

Food-spoilage fungi.

Wareing P., Stuart F., Fernandes R. Micro-facts: the working companion for food microbiologists. Wareing P., Stuart F., Fernandes R. Leatherhead, RSC Publishing, 2010 (ISBN : 978-1-905224-84-5) 287-340 (76 ref.) (saan: 800280)

This guide to food spoilage fungi covers the following topics: moulds and mycotoxins in food; mycotoxins; sources of and illness caused by aflatoxins, ochratoxin A (OTA), patulin, fumonisins, trichothecenes and zearalenone; growth requirements for optimum toxin production (temperature, pH, water activity and preservatives) and types of toxins produced by *Alternaria*, *Aspergillus*, *Byssoschlamys*, *Chaetomium*, *Chrysosporium*, *Emericella*, *Eurotium*, *Fusarium*, *Penicillium*, *Phoma* and *Wallemia*; and other spoilage moulds; A summary of the environmental requirements for moulds and yeasts to grow is included.

The use of *Lactobacillus brevis* PS1 to in vitro inhibit the outgrowth of *Fusarium culmorum* and other common *Fusarium* species found on barley.

Mauch A., Dal Bello F., Coffey A., Arendt E.K. International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (June 30), 141 (1-2), 116-121 (43 ref.) En:en (saan: 800259)

Fusarium species can infect cereal crops and produce mycotoxins, which present a food safety risk. This work screened a total of 129 lactic acid bacteria from human, dairy and animal sources for their antifungal activity against *Fusarium graminearum*, *Fusarium poae* and *Fusarium culmorum*. The most active inhibitory LAB was *Lactobacillus brevis*, which is believed to produce organic acids and proteinaceous substances with antifungal activity.

Development of a specific TaqMan real-time PCR assay for quantification of *Fusarium graminearum* clade 7 and comparison of fungal biomass determined by PCR with deoxynivalenol content in wheat and barley.

Demeke T., Grafenhan T., Clear R.M., Phan A., Ratnayaka I., Chapados J., Patrick S.K., Gaba D., Levesque C.A., Seifert K.A. International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (June 30), 141 (1-2), 45-50 (23 ref.) En:en (saan: 800249)

Fusarium graminearum clade 7 is reported to be the predominant lineage linked to fusarium head blight in North America and Europe. Establishing relationships between *Fusarium graminearum* biomass and *Fusarium* damaged kernels and deoxynivalenol (a mycotoxin) is needed to correlate bioassay results with contamination risks. This work





describes the development of a real-time PCR assay for *Fusarium graminearum* clade 7, the relationship between *Fusarium graminearum* total biomass as determined using PCR and deoxynivalenol content in wheat and barley and to compare the level of *Fusarium* damaged kernel levels with *Fusarium graminearum* biomass and deoxynivalenol content in wheat. The quantitative PCR was specific and the biomass estimate results correlated closely with deoxynivalenol content and *Fusarium* damaged kernels in wheat and barley. This is particularly useful for barley as there are no reliable symptoms visually to assess the level of *Fusarium* head blight in this crop.

Heterologous expression of the hydrophobin FcHyd5p from *Fusarium culmorum* in *Pichia pastoris* and evaluation of its surface activity and contribution to gushing of carbonated beverages.

Stuber M., Lutterschmid G., Vogel R.F., Niessen L. International Journal of Food Microbiology (ISSN : 0168-1605) 2010 (June 30), 141 (1-2), 110-115 (41 ref.) En:en (saan: 800258)

Hydrophobins are small proteins that are produced by fungi and can stabilise air bubbles in water. However, this can be a problem in beer and carbonated beverages where their unexpected presence causes unwanted gushing and loss of beverage. This work describes the expression of the class II hydrophobin FcHyd5p from *Fusarium culmorum* in *Pichia pastoris*, its surface and surfactant properties and its role in beer gushing. The presence of FcHyd5p in beer and carbonated water led to significant gushing. *Fusarium culmorum* is a pathogen of barley and potential contaminant of malt and these findings highlight the potential process problems it can cause in beverages.

Occurrence of ochratoxin A in raw ham muscle, salami and dry-cured ham from pigs fed with contaminated diet.

dall'Asta C., Galaverna G., Bertuzzi T., Moseriti A., Pietri A., Dossena A., Marchelli R. Food Chemistry (ISSN : 0308-8146) 2010 (June 15), 120 (4), 978-983 (26 ref.) En:en (saan: 800169)

Pigs challenged with feed contaminated with ochratoxin A (OTA) were used to assess different contamination routes. Thighs and minced meat from control and treated groups were used to produce dry-cured hams and salami, respectively. Carry-over in muscle was low. Toxicogenic mould population growing on the surface during ripening made a significant contribution to OTA contamination in dry-cured hams. OTA was found on the surface portion and inner core of dry-cured ham from the Italian market.

Occurrence of free and conjugated *Fusarium* mycotoxins in cereal-based food.

Vendl O., Crews C., MacDonald S., Krska R., Berthiller F. Food Additives and Contaminants (ISSN : 0265-203X) 2010 (August), 27 (8), 1148-1152 (18 ref.) En:en (saan: 800160)

Fusarium toxins, such as deoxynivalenol and zearalenone, can be partly metabolised in infected plants. This paper reports the results of a surveillance study for deoxynivalenol and zearalenone and their metabolites: deoxynivalenol-3-glucopyranoside, 3-acetyldeoxynivalenol, zearalenol-4-glucopyranoside, alpha-zearalenol, beta-zearalenol, alpha-zearalenol-4-glucopyranoside, beta-zearalenol-4-glucopyranoside and zearalenone-sulfate. A total of 84 cereal-based foods were collected and a total of 25 composite products, including beer, were screened for the mycotoxins and metabolites. Zearalenone-4-sulfate was detected in 13 of the composites at low concentrations, and deoxynivalenol, zearalenone and deoxynivalenol-3-glucopyranoside were also detected in some samples. Bran flakes had the highest mycotoxin content.

Aflatoxins and ochratoxin A in tea prepared from naturally contaminated powdered ginger.

Iha M.H., Trucksess M.W. Food Additives and Contaminants (ISSN : 0265-203X) 2010 (August), 27 (8), 1142-1147 (16 ref.) En:en (saan: 800159)

The effect of different preparation steps (steeping) on the distribution of aflatoxins B1, B2, G1 and G2 and ochratoxin A in tea made from naturally contaminated ginger powder was investigated in this study. Powdered ginger was contained in a heat-sealable tea bag and tea was prepared at different temperatures (50 and 100 C), steeping times (5 and 10 minutes) and volumes (100 and 200 ml). Aflatoxins and ochratoxin A were determined in the tea and the ginger residue following the steeping by HPLC with fluorescence detection. Migration of aflatoxins (30-40%) and ochratoxin A (20-30%) from the contaminated ginger to the ginger tea was observed at 100 C, but only 10% of these mycotoxins were found in the tea following steeping at 50 C. Less than 5% variation between the different preparation methods is reported.

Natural occurrence of fumonisin B2 in red wine from Italy.

Logrieco A., Ferracane R., Visconti A., Ritieni A. Food Additives and Contaminants (ISSN : 0265-203X) 2010 (August), 27 (8), 1136-1141 (26 ref.) En:en (saan: 800158)





Recent studies have reported the ability of strains of *Aspergillus niger*, which can infect grapes, to produce fumonisins B2 and B4. In this study surveillance of wines for these two mycotoxins was carried out using liquid chromatography-tandem mass spectrometry (LC-MS/MS). A total of 51 samples (45 red, five white and one rose wines) from different Italian regions were analysed. Fumonisin B2 was detected in nine samples of red wines at levels of 0.4-2.4 ng/ml, but fumonisin B4 was not detected in any of the samples. The authors conclude that fumonisin B2 can be found as contaminant in wines, and although levels are relatively low there is a potential risk of exposure to fumonisin B2 for wine consumers.

Modification of aflatoxin B1 and ochratoxin A toxicokinetics in rats administered a yeast cell wall preparation.

Firmin S., Gandia P., Morgavi D.P., Houin G., Jouany J.P., Bertin G., Boudra H. Food Additives and Contaminants B (ISSN : 0265-203X) 2010 (August), 27 (8), 1153-1160 (many ref.) En:en (saan: 800161)

Previous studies have identified the ability of cell wall of *Saccharomyces cerevisiae* to bind aflatoxins in vitro, and the aim of this study was to examine the effect of a yeast cell wall preparation on the toxicokinetics and balance excretion of aflatoxin B1 and ochratoxin A following oral administration of tritium-labelled mycotoxins to rats. The extent of aflatoxin absorption was decreased by administration of yeast cell wall, but the rate of absorption was not affected. Faecal excretion of aflatoxin B1 was increased by 55% and urinary excretion was slightly decreased. Yeast cell wall had a much less significant affect on ochratoxin A. The authors conclude that the in vivo mycotoxin binding activity of yeast cell wall agrees with findings in vitro, that yeast cell wall can be used to protect monogastric animals exposed to dietary intake of mycotoxins.

Survey of the presence of patulin in fruit juices.

Bonerba E., Ceci E., Conte R., Tantillo G. Food Additives and Contaminants B (ISSN : 1939-3210) 2010 (June), 3 (2), 114-119 (38 ref.) En:en (saan: 800047)

The presence of the mycotoxin patulin in fruit juices purchased from Italian supermarkets and retail outlets in 2008 was assessed to determine potential consumer risk and raw materials quality. A total of 35 apple juices, 35 mixed flavour juices and 35 pear juices produced by different Italian and European companies were analysed using a previously published method. Apple juices contained a patulin concentration of 6 to 30 mcg/litre with a mean of 18 mcg/litre, while mixed fruit juices had a concentration

of 1 to 45 mcg/litre with a mean of 23 mcg/litre, and pear juices exhibited a content of 5 to 92 mcg/litre with a mean of 43 mcg/litre. A total of 14 of the 35 fruit juice samples analysed showed a patulin level higher than the EU recommended limit of 50 mcg/litre.

Surveys of aflatoxin B1 contamination of retail Turkish foods and of products intended for export between 2007 and 2009.

Ulca P., Evcimen M.K., Senyuva H.Z. Food Additives and Contaminants B (ISSN : 1939-3210) 2010 (June), 3 (2), 120-125 (9 ref.) En:en (saan: 800048)

The aflatoxin B1 contents of 3,345 commercial Turkish food products supplied by producers for testing or export certification between 2007 and 2009 were assessed. Foods were categorised as high sugar products with nuts, nuts and seeds, spices, grains, cocoa products, dried fruit and vegetables, processed cereal products, tea, and baby foods and infant formula. Analysis of aflatoxin B1 was carried out using HPLC with fluorescence detection following immunoaffinity column clean-up, with recoveries of 91 to 99% being observed. Of the samples analysed, 94% were found to contain aflatoxin B1 at levels below the EU limit of 2 mcg/kg that applies to nuts, dried fruit and cereal products. The total of 6% of 2006 contaminated samples were mainly nuts and spices, with 24 to 42% of pistachio samples exhibiting aflatoxin B1 levels above 2 mcg/kg.

Correlation between aflatoxin contamination and various USDA grade categories of shelled almonds.

Whitaker T.B., Slate A., Birmingham T., Adams J., Jacobs M., Gray G. Journal of AOAC International (ISSN : 1060-3271) 2010 (May-June), 93 (3), 943-947 (7 ref.) En:en (saan: 800025)

The association between aflatoxin contamination and different USDA categories used to grade raw shelled almonds was investigated. Samples of shelled almonds were categorised according to USDA grades of high quality, insect damage, fungal damage, mechanical damage and other defects. For 50 samples assessed, kernels in the high quality grade accounted for 83.7% of the kernel mass and 3.25 of the aflatoxin mass. Kernels in the other four damage grades accounted for 16.3% of the kernel mass and 96.8% of the aflatoxin mass. Insect damage grade kernels exhibited the highest risk for aflatoxin contamination. Almonds in the insect damage grade accounted for 76.3% of total aflatoxin mass and 7.2% of kernel mass. Regression equations were developed to predict aflatoxin





concentration in each sample via determination of aflatoxin mass in one or more damage grades.

Determination of aflatoxins B1, B2, G1 and G2 in olive oil, peanut oil and sesame oil.

*Bao L., Trucksess M.W., White K.D.
Journal of AOAC International (ISSN : 1060-3271)
2010 (May-June), 93 (3), 936-942 (24 ref.) En:en
(saan: 800024)*

The development and validation of a method using immunoaffinity column clean-up with reverse-phase liquid chromatography (RPLC) separation and fluorescence detection for determination of aflatoxins B1, B2, G1 and G2 in olive oil, peanut oil and sesame oil are described. After immunoaffinity column clean-up, toxins were eluted with methanol and subjected to RPLC/fluorescence detection analysis following postcolumn UV photochemical derivatisation. Recoveries of aflatoxin B1 spiked at levels of 1.0 to 10.0 mcg/kg in olive oil, peanut oil and sesame oil were 82.9 to 98.6%, while relative standard deviation (RSD) was 0.6 to 8.9%. Recoveries of aflatoxin spiked at levels of 2.0 to 20.0 mcg/kg were 87.7 to 102.2%, with RSDs of 1.3 to 12.6%. Identification of aflatoxins in naturally contaminated peanut oil was confirmed using liquid chromatography with tandem mass spectrometry.

Contaminants in milk: routes of contamination, analytical techniques and methods of control.

*Nag S.K. Improving the safety and quality of milk.
Volume 1: milk production and processing. Griffiths M.W. Cambridge, Woodhead Publishing, 2010 (ISBN : 978-1-84569-438-8) 146-178 (many ref.) En (saan: 799917)*

This chapter reviews routes of chemical contamination of milk-producing animals, and mechanisms by which contaminants enter the milk. Analytical techniques for the detection of pesticide residues, heavy metals, radionuclides, veterinary drug residues, mycotoxins, nitrates and nitrites, detergents and disinfectants in milk are described. Regulatory aspects are outlined, with tables summarising maximum residue limits (MRLs) for individual pesticides, toxic metals and veterinary drugs. The incidence of melamine contamination in Chinese milk powder, and the health implications of its addition to milk are discussed.

Pesticides, veterinary residues and other contaminants in milk.

*Nag S.K. Improving the safety and quality of milk.
Volume 1: milk production and processing. Griffiths M.W. Cambridge, Woodhead Publishing, 2010 (ISBN : 978-1-84569-438-8) 113-145 (many ref.) En (saan: 799916)*

The sources and potential health implications of chemical contaminants in milk are reviewed in this chapter, with reference to pesticide residues, heavy metals, radionuclides, veterinary drugs, mycotoxins, nitrates and nitrites, detergents and disinfectants. For each category, information is given on sources of contamination, analytical techniques, regulatory aspects and methods for managing contamination.

Regulatory toxicology.

May G.G. Food science and technology. Campbell-Platt G. Singapore, Wiley Blackwell, 2009 (ISBN : 978-0-632-06421-2) 399-410 (32 ref.) En (saan: 799877)

The public health implications of potentially toxic chemicals in foods are discussed and methods for establishing and reducing the risks are considered in this chapter. Guidance is given on regulatory toxicology; hazard identification and characterisation; risk management; chemical hazards in foods, including food additives, veterinary drug additives, pesticide residues, toxic metals (lead, mercury, cadmium, polychlorinated biphenyls, DDT and dioxins) and natural toxicants (mycotoxins, marine biotoxins, plant toxins, biogenic amines, processing reaction products and adulterants).

