THEME 3

Human exposure to chemical cocktails present in foods

Understanding the growing levels of human exposure to multiple chemicals present in foods. Formulating a call for action to build develop new ways of assessing the risks to human health from these exposures.

Can chemicals in food be decontaminated? - Lead by MultiCoop Project

MultiCoop

UNIVERSITY OF CHEMISTRY AND TECHNOLOGY PRAGUE

BOKU Universität für Bodenkultur Wien
University of Natural Resources and Applied Life Sciences, Vienna

QUEEN'S UNIVERSITY BELFAST

Multidisciplinary approach to strengthen cooperation and establish novel platform for comprehensive assessment of food and feed safety

Can chemicals in food be decontaminated? - Lead by MultiCoop Project

Meeting Room 2

Speaker

Dr. Katrina Campbell
Lecturer
IGFS, Queens University Belfast

Panel Member - Can chemicals in food be decontaminated?
2:00 - 3:00
Biography

Ms. Susan MacDonald
Science Lead
Natural Toxins
Fera Science Ltd

Panel Member - Can chemicals in food be decontaminated?
2:00 - 3:00
Biography

Doctor Wulf-Dieter Moll
Biomin Research Center

Panel Member - Can chemicals in food be decontaminated?
2:00 - 3:00
Biography

Chair

Rudolf Krska
Head Of Institute
University of Natural Resources and Life Sciences

Senior Rapporteur

Mari Eskola
University of Natural Resources and Life Sciences

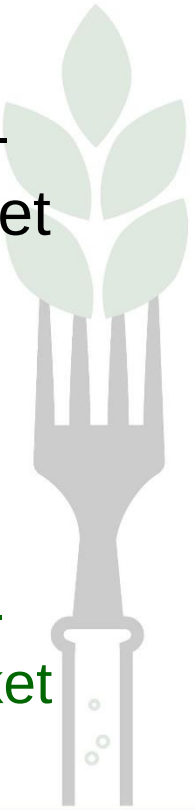
OUR FOOD IS OUR FUTURE
BELFAST SUMMIT ON GLOBAL FOOD INTEGRITY
ASSET 2018
WATERFRONT HALL 28TH-31ST MAY

Chemicals that may enter the food supply

- **Food additives**: preservatives, sweeteners, etc
- **Other food contact chemicals**: food packaging materials (BPA), processing aids,…
- **Agrochemicals**: pesticides and veterinary drugs
- **Natural toxins:** fungal (mycotoxins), algal, microbial, plant
- **Adulteration**: e.g. melamine in milk powder
- **"Processing-induced" chemicals**: acrylamide, furan, chloropropanols (e.g. 3-MCPD), hidden allergens
- **(Environmental) Contaminants**: metals, POPs (e.g. dioxins), …

pre-market

post-market



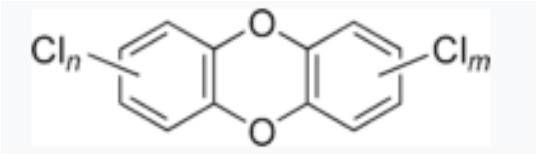
Decontamination of dioxins and PCBs from fish meal

SCIENTIFIC OPINION

EFSA Journal

ADOPTED: 23 January 2018

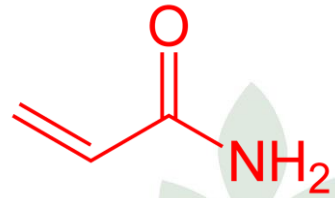
Assessment of a decontamination process for dioxins and PCBs from fish meal by replacement of fish oil



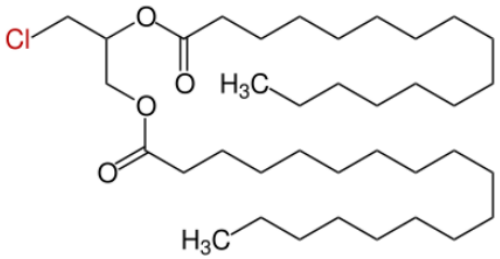
- Extraction of the fish oil, filtration and adsorption with **activated carbon**, and **replacement with decontaminated fish oil**

- **Conclusions**:
  - does not lead to any detrimental changes in the nature of the fish meal
  - it was noted that the process could deplete some beneficial constituents (e.g. oil-soluble vitamins)

Reduction of processing induced contaminants



- Acrylamide
  - Reducing the concentrations of reducing sugars
  - Increasing the concentrations of reactants (e.g. other amino acids) competing with asparagine
  - **Changing processing conditions** (lower pH, **lower temperature**, shorter heating times)



- 3-MCPD esters in vegetable oils:
  - Removal of the esters from the refined product by **adsorbents**

Reduction of mycotoxins

2004

Removal of Ergot from Barley by Density Separation

Kamal M. Adam
Iowa State University

- **Density separation** (Ergots)
- **Separation** of contaminated grain and non-contaminated grain **on the basis of size**
  - SCAN (EFSA report): can be inaccurate; animal health is dependent on its alkaloid content and composition
- **Blending:** However, blending of contaminated grain with batches of good quality material is prohibited for **food** in the EU (limited approval for **feed**)

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Eliminating Aflatoxin B1 contaminated figs through real time sorting

BOKU
IFA TULLN
foodlife international ltd.

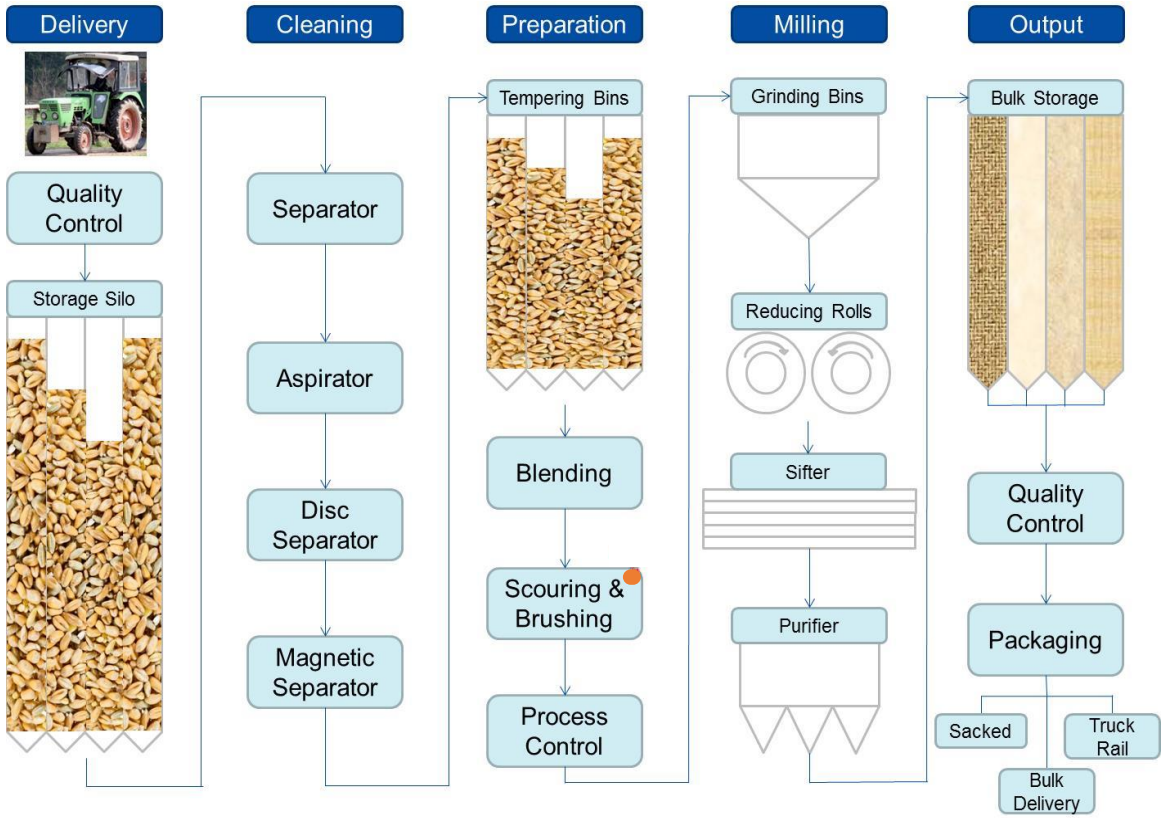
MyToolBox
THE SMART WAY TO TACKLE MYCOTOXINS

EVK

TARİŞ
İNCİR BİRLİĞİ
1915

Using a combination of VISNIR (incl. UV-Fluoreszenz), NIR and SWIR

Innovative milling of wheat and novel baking procedures



Comprehensive REVIEWS in Food Science and Food Safety

Comprehensive Reviews in Food Science and Food Safety | Free Access

The Fate of Mycotoxins During the Processing of Wheat for Human Consumption

Sara Schaarschmidt, Carsten Fauhl-Hassek

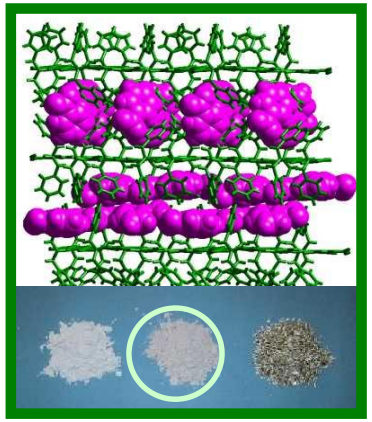
First published: 14 March 2018 | https://doi.org/10.1111/1541-4337.12338 | Cited by: 1

MyToolBox
THE SMART WAY TO TACKLE MYCOTOXINS

Mycotoxin „decontamination“ strategies

ADSORPTION

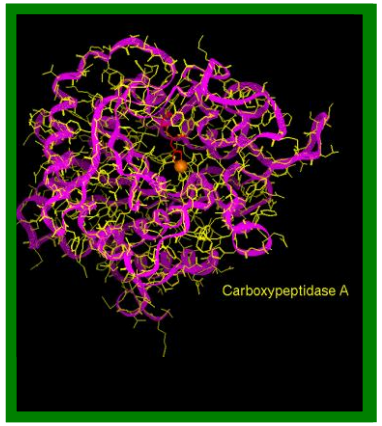
Elimination of toxin



…reduction of mycotoxin – bioavailibility

BIOTRANSFORMATION BIODEGRADATION

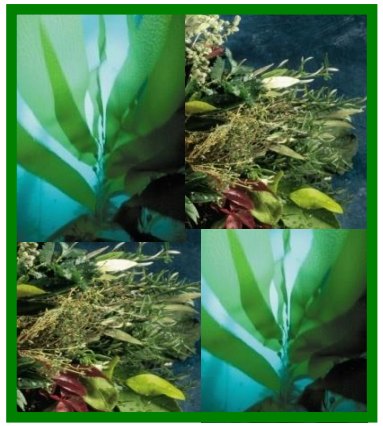
Elimination of toxicity



… enzymatic detoxification prior to resorption

BIOPROTECTION

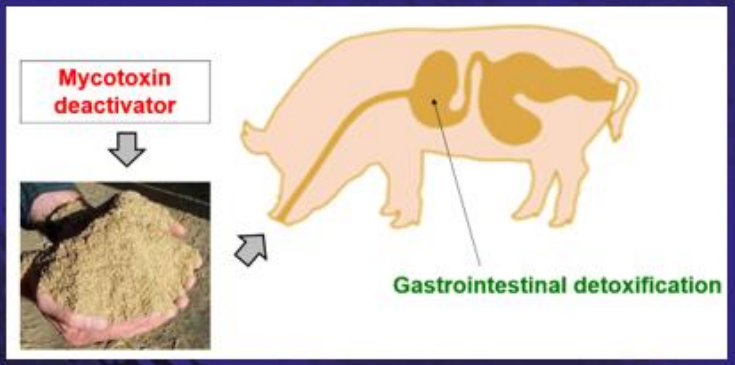
Elimination of toxic effects



…elimination of toxin related effects

Biomin®

2. Detoxifiers



There is a need for further development, exploration and harmonised safety assessment of detoxifiers across the continents

- Explore the potential of existing detoxifiers for novel applications such as their use in bioethanol and DDGS production
- Utilize new tools, such as metagenomics, to develop new (enzyme-based) detoxifiers
- Obtain mutual recognition/authorisation of detoxifiers between EU and China

THE World Mycotoxin Forum 10TH CONFERENCE

Discussion

- **Prevention** is better than decontamination
  - e.g. biocontrol to prevent **mycotoxin** formation
  - e.g. reducing **acrylamide** formation
- Shall decontamination procedures existing for **feed** be applied for **food**?
- Risk to **eliminate beneficial nutrients** through decontamination
- By using degradation approaches **more toxic metabolites** may be formed
- **There is no silver bullet** = no generic approach to decontaminate all chemicals in food = shotgun of bullet for various chemicals
- **Consumer acceptance** and perception important – they want food free of chemicals
- Majority indicated that they would not be in favour of consuming decontaminted food
- But de-caffeineted coffee = perfectly accepted by consumers