ABSTRACTS OF LECTURES AND POSTERS

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Taking mycotoxin control to the next level

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Risk-benefit assessment in foods: a case study involving mycotoxins

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Over the last years, the contamination of different foodstuffs with multiple mycotoxins has been highly reported. Data from a recent Portuguese national project that studied the toxic effects of exposure to mycotoxins in infant foods (MYCOMIX) reported the co-occurrence of 21 mycotoxins and metabolites present in breakfast cereals primarily marketed for children. This study showed that almost all the analyzed breakfast cereal samples (96%) were contaminated with mycotoxins. The output of this project also highlighted the knowledge gaps on the contra-balance beneficial health effect of these foods, and the need to determine the risk-benefit balance, since the evaluated food products, namely breakfast cereals, are simultaneously recognized as vehicles of food components, such as nutrients, vitamins and water soluble and insoluble fibres, which could be assumed as beneficial for children health. Health risks associated with consumption of cereal-based foods, an important source of nutrients with beneficial health effects, could increase in the near future due to climate changes in Europe (dry conditions and increased ambient temperatures), thus the dissemination and use of risk-benefit assessment (RBA) tools in Europe would be of utmost importance to support food and health policies. Can we ever have a harmonized tool that enables food and health authorities to estimate the balance between risk and benefit of foods usually contaminated by mycotoxins, such as cereals-based products? This is a question that can be raised to contribute to the development of tools that can estimate the overall health effects of foods, food ingredients and diets and that can be applied to data from different countries. RiskBenefit4EU aims to strengthen the EU capacity to assess and integrate food risks and benefits in the areas of microbiological, nutritional and chemical components through the development of a harmonized framework. This project will enable the RBA framework created using a Portuguese case study on breakfast cereals, including results obtained under the MYCOMIX project. Acknowledgments. Financial support by RiskBenefit4EU – Partnering to strengthen the risk-benefit assessment within EU using a holistic approach (Grant Agreement Number G6/EFSA/AFSCO/2017/01 - GA02): OEE-Castro de Estudos de Bioclonização Humana de Âmbito Nacional /BioMAN, BioMAN/DAN/01) by INSIA, and CESAM by the Portuguese Foundation for Science and Technology (FCT) (UID/AMB/50017/2013).

Survey of ochratoxin A, deoxynivalenol, citrinin and sterigmatocystin in craft and industrial beers
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Occurrence of ochratoxin A (OTA) and deoxynivalenol (DON) in beer was reported in several studies; their contamination was probably due to storage conditions of malted grains. Other mycotoxins were rarely detected in beers. For sterigmatocystin (STC) and citrinin (CIT), EFSA recently requested data on their presence in beer [EFSA, 2012. EFSA Journal 10:2605; EFSA, 2013. EFSA Journal 11:3254]. STC was detected in few samples of European beers [Veršløvskis et al., 2008, World Mycotoxin Journal 1:161]. In the last decade, consumption of craft beers, a heterogeneous class of beers, sometimes brewed from unusual ingredients, increased in Europe and USA. However, craft beers are scarcely investigated for the content of undesirable components, as mycotoxins. Occurrence of both known and emerging mycotoxins was performed in this survey. Sampling of most sold 80 beers (40 craft and 40 industrial) in Italy was carried out. Three sub-samples were collected in different retail outlets in the period June-August 2017, mixed and two samples (about 100 ml each) were kept at -20°C. Before the analysis, each sample was gently shaken and degassed by ultrasonication. The analyses were carried out using both liquid and gas chromatographic instruments, coupled to fluorimeter or mass spectrometers. The limit of detection was 0.5 ng/l for OTA and STC, 4 µg/l for DON, 5 ng/l for CIT. OTA
State of the art

Data from a recent Portuguese national project that studied the toxic effects of children exposure (under 3 years old) to multiple mycotoxins in infant foods (MYCOMIX) reported the co-occurrence of 21 mycotoxins and metabolites present in breakfast cereals primarily marketed for children. This study showed that 96% of the analyzed breakfast cereal samples were contaminated with mycotoxins. The output of this project also highlighted the knowledge gaps on the contra-balance beneficial health effect of these foods, and the need to determine the risk-benefit balance, since the evaluated food products, namely breakfast cereals, are simultaneously recognized vehicles of food components, like nutrients, vitamins and water soluble and insoluble fibers, which could be assumed as beneficial for children health.

Question to brainstorm at WMF Conference?

Health risks associated with consumption of cereal-based foods, an important source of nutrients with beneficial health effects, could increase in the near future due to climate changes in Europe (dry conditions and increased ambient temperatures).

Health risks:
- chemical (e.g. mycotoxins) hazards
- microbiological (e.g. Bacillus cereus) hazards

Beneficial ingredients:
- Dietary fiber (e.g. prevention and treatment of childhood obesity, maintenance of normal blood glucose and lipid values and blood pressure, risk reduction for future chronic diseases, such as cancer, cardiovascular disease (CVD), and type 2 diabetes)

RiskBenefit4EU – Partnering to strengthen the risk-benefit assessment within EU

RiskBenefit4EU – Partnering to strengthen the risk-benefit assessment within EU using a holistic approach is a recent European project funded by EFSA (GP/EFSA/AFSCO/2017/01-GA02) in a joint initiative of 5 organizations from 3 EU member states: National Institute of Health Dr. Ricardo Jorge (INSA), Portugal, Economic and Food Safety Authority (ASAE), Lisbon, Portugal; Instituto National de la Recherche Agronomique (INRA), Paris, France; National Food Institute, Technical University of Denmark (DTU), Denmark. This project aims to strengthen the EU capacity to assess and integrate food risks and benefits in the areas of microbiology, nutrition and toxicology through the development of a harmonized framework that will be available to EU member states organizations.

Task 1

Management and coordination activities associated to the project organization.

Leader: INSA, in close collaboration with all the partners of the consortium.

Task 2

Capacity building activities and framework development. Include knowledge transfer through:

i) capacity building of all partners for the methodologies needed for RBA that integrates scientific knowledge on microbiology, nutrition and toxicology, using common health metrics

ii) development of the harmonized framework for RBA through a holistic approach.

Leader: INRA

Task 3

Application of the generated framework (task 2) to a case study.

A Portuguese case study on cereal-based foods, gathering already obtained data, will be used to validate the RBA framework, including the three components – microbiological, nutritional and toxicological.

Leader: DTU

Task 4

Sustainability of the generated capacity building and dissemination activities.

Leader: INSA

Task 5

Quality assurance and the impact evaluation of the main activities developed under RiskBenefit4EU.

Leader: UPORTO

Expected Results

The expected impact of RiskBenefit4EU stands to help further developing and establishing RBA as a tool to provide scientific evidence to inform risk management decisions in the area of food safety and nutrition at a national, regional and international level. RiskBenefit4EU will create a harmonized framework that different EU institutions could use and apply for their realities and food problems.

Furthermore, the collaborations to be settled will provide a unique opportunity to establish critical mass thinking for this research area.

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