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The Challenge

In 2014, the **majority of EU's RASFF** (Rapid Alert System for Food and Feed) **rejections were due to mycotoxin contamination** that exceeded the regulatory limits.^a Grain and foods based on these grains account for the largest contribution to mycotoxin exposure in all age classes of the EU population, in particular due to the mycotoxins produced by *Fusarium* spp. In general, it is estimated that mycotoxins account for **5-10% of annual crop losses worldwide**.^b Considering an average **EU-wide production of wheat, maize and oats** of about 203 Mt since 2005 (worth about 32.95 billion €), losses could easily exceed **1 billion € per year**.^c On top of that, extreme weather events as a result of climate change is increasingly affecting the mycotoxin map in Europe and world-wide. Thus, there is a pressing need to mobilise the wealth of knowledge that exists from the mycotoxin research conducted over the past decades and to perform cutting-edge research where knowledge gaps still exist.

Motivation & Approach

Previous studies have shown that the combination of more than one control strategy in an integrated system has a synergistic positive effect (i.e. the combined effect is greater than the sum of the parts). Thus the consideration of the **entire chain soil-field-crop-food processing-waste management-alternative energy**, to ensure food & feed security and safety within a sustainable economic approach, is a major motivation behind MyToolBox. The project will build on existing knowledge, combined with novel findings, which will be **integrated into an internet-based tool that provides decision support to actors along the food and feed chain to effectively reduce mycotoxin contamination** – this is the mission of MyToolBox.

The Consortium

The proposal was submitted for funding to the European Commission's Horizon 2020 programme under the **2014-2015 societal challenge on „Biological contamination of crops and the food chain“**. **23 partners from 11 countries**, including **7 EU member states, Turkey, Serbia, Ukraine and China**, are working on the shared goal for an integrated (My)ToolBox to reduce mycotoxin contamination along the food-and-feed chain. With more than **40% participation of industry and SMEs**, and **5 partners representing end-users**, the project aims for applicable research solutions for stakeholders all along the chain. Furthermore, an **Advisory Board**, consisting of **representatives from regulatory and policy organisations** involved in the regulation of food and feed safety (e.g. EFSA, FAO, DG Santé), will assist the consortium during the entire funding period from March 2016 until February 2020.



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The Project - www.MyToolBox.eu

Post-harvest Objectives

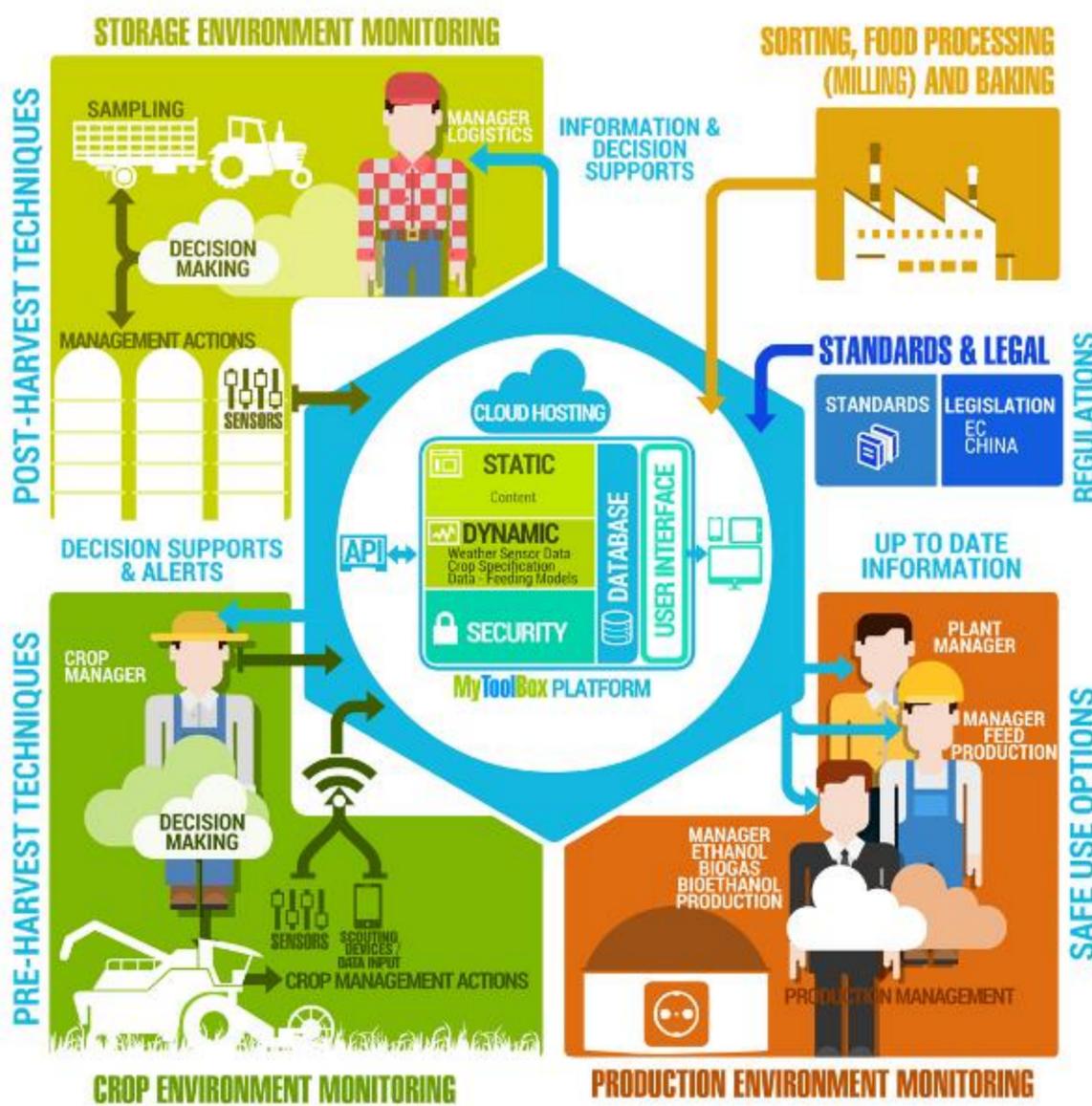
- To establish **real-time post-harvest environmental monitoring systems** for storage of cereals and peanuts
- To develop **non-invasive real time sorting of dried figs** for aflatoxin B1 using hyperspectral imaging

Pre-harvest Objectives

- To implement **alternatives to conventional fungicides** (suitable for organic farming) for cereals
- To integrate **cultural control protocols** targeting the *Fusarium* inoculum within crop debris using **biofumigation** and accelerated biodegradation combined with **minimum tillage**
- To reduce aflatoxin contamination in EU maize through **resistant plant cultivars** and the use of atoxigenic *Aspergillus* strains
- To develop **novel forecasting approaches** to predict potential fungal contamination of cereals at an early growth stage

Safe Use Options

- Utilising a novel generation of **mycotoxin degrading enzymes** for the safe use of contaminated batches to efficiently produce **biogas and bioethanol**
- To minimize the mycotoxin content in **dried distillers' grain soluble (DDGS)**



Sorting, Food processing and Baking

- To study **novel baking procedures** at industrial scale to reveal the thermal processing factors which are relevant for the reduction of mycotoxins and their transformation into modified forms
- To integrate novel down-stream processing approaches such as **innovative (pre-) milling** for accurate separation of grain tissues and to minimise the mycotoxin content in wheat based food products

Contribution to Standard Setting and Cooperation with China

- To **anticipate legislative implications** of the MyToolBox project outputs and to work with relevant bodies such as EFSA and DG Santé for standard setting
- To contribute to the **standard settings** for authorisation of **mycotoxin-detoxifying feed additives** in China

The MyToolBox e-platform

- To design and validate an integrated MyToolBox **e-platform for decision support** in mycotoxin management
- Through the e-platform **information, tools and guidance** concerning actions that can be taken to reduce mycotoxins will be provided to all actors along the food and feed chains
- To provide access through **PCs, tablets or smartphones**

Outlook

- The outcome of the **MyToolBox** project with **novel intervention strategies** will be assembled in the web-accessible **MyToolBox e-platform** based on new ICTs
- MyToolBox** will provide multiple information to support decision-making in mycotoxin management by all **actors along the food- and feed-chains**
- The incentives of all actors will be studied and used to build up this web-based **decision-support-system** to maximise the opportunities for practical use of the e-platform by all stakeholders.



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