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FoodSafeR is a 4-year Horizon Europe funded research project that started in October 2022.

The project aims to design, develop, and test the building blocks of an innovative proactive and holistic food safety warning and management system, which focuses on emerging of food safety hazards and associated risks.

FoodSafeR embodies integrated approaches to hazard characterisation and risk management in a comprehensive suite of future-oriented case studies, tools, methods, strategies, models, guidance, and training materials.

These resources are being made available in the **FoodSafeR Open Digital Hub**, a one-stop-shop platform uniting a community of professionals from the European and international food safety system.



This Project has Received funding from the European Union's Horizon Europe Research and Innovation Programme Under Grant Agreement No. 101060698



Predictive modelling for early warning mycotoxins

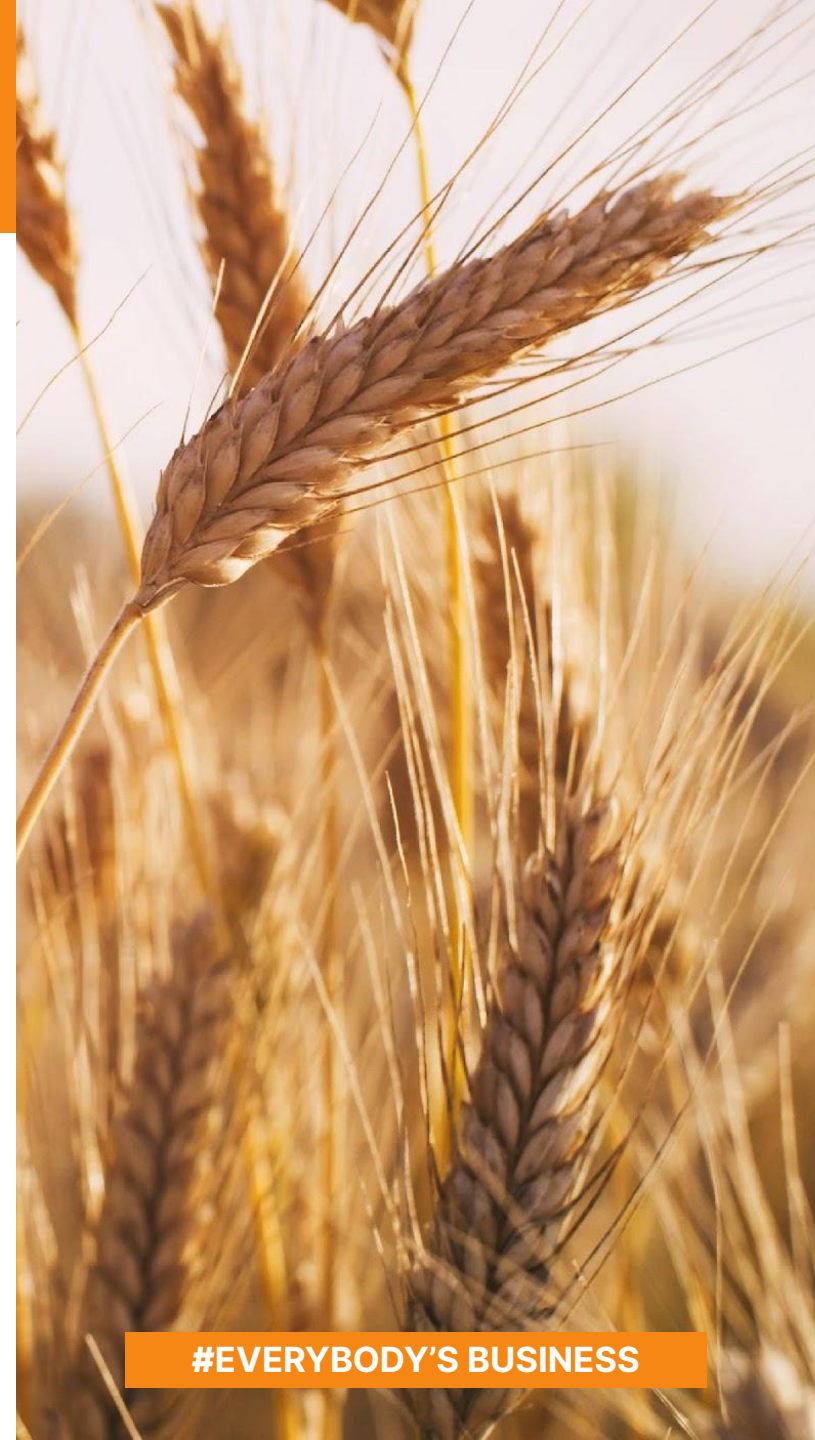
Introduction

Mycotoxins are produced by filamentous fungi upon and after infection of crops, such as grains and nuts. Mycotoxins are chemicals that are toxic to animal and human health. Animals and human are exposed to mycotoxins via consumption of contaminated feed and food, respectively. Mycotoxins can be formed in the growing stage of agricultural commodities, but also later in the supply chain, during storage. Once present in agricultural commodities, mycotoxins can hardly be removed since they are very stable chemicals and can stand many processing steps. Therefore, prevention is of utmost importance.

The presence of fungi and mycotoxins in commodities is affected by environmental, agronomical and storage practices. In the field, local weather conditions have an effect, but also crop varieties used and other agronomical practices.

Predictive modelling of the presence of mycotoxins can provide assistance to decision makers for prevention and control of mycotoxins.

With predictive modelling, the effects of influencing factors (weather, agronomics, storage) are captured in a mathematical model to predict – in an early stage- the presence of the mycotoxins. Besides knowledge on the biological influences, data are also needed to develop such models



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The Team

The FoodSafeR consortium of 19 leading academic, research and industry organisations from across Europe, is led by FFOQSI.

FFoQSI is the Austrian Competence Centre for Food and Food Quality, Safety and Innovation. It is a multidisciplinary joint research hub that encompasses scientific, national and international business partners food safety authorities and stakeholders, technology SMEs and startups from the food system.

The FoodSafeR Advisory Board of 25 leading stakeholders from the food safety field gives us a global reach.



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Summary of the findings

Available predictive models

To date, most of the available models focused on the major mycotoxins in grains, i.e. the presence of Deoxynivalenol in wheat, and of Aflatoxins B1 in maize. Within FoodSafeR, predictive models are developed for these, but also other major mycotoxins- grain combinations, using a rich dataset on European mycotoxin monitoring data, and using state of the art modelling techniques (including machine learning). The focus is on the prediction of mycotoxins at harvest.

Knowing the estimated toxin contamination levels at harvest already in advance, i.e. during the cultivation season of the grains will help risk managers for a) risk based inspection, b) decision on buying batches and contracts, and c) optimizing routing and processing of the grain batches. The predictions can be envisaged by maps. Figure 1 presents such a map, for illustration purposes only, of mycotoxin contamination class (high, medium, low) in Europe.

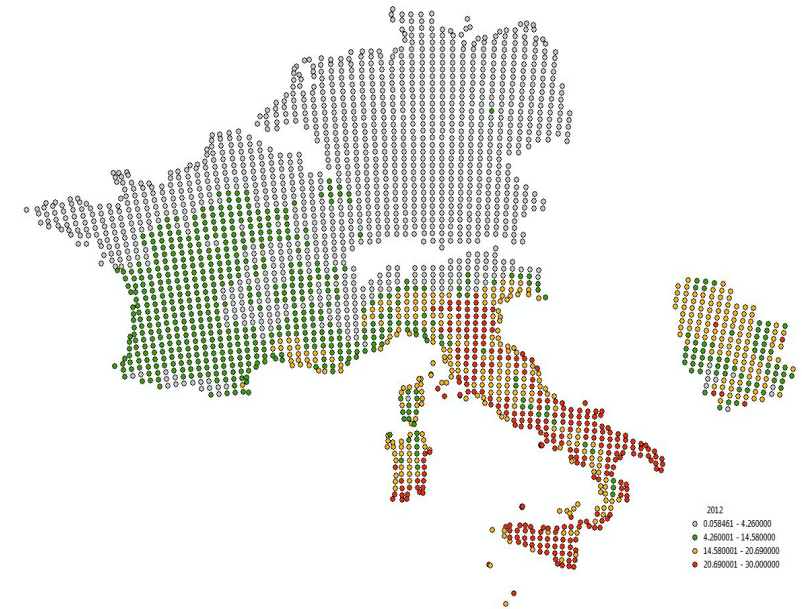


Figure 1. Map for predicted mycotoxin levels per region in Europe, for illustration purposes only.