MYCORED: EU'S 7TH FRAMEWORK PROGRAM PROJECT ON MYCOTOXIN REDUCTION

Novel Integrated Strategies for Worldwide Mycotoxin Reduction in Food and Feed Chains

The European Union's 7th Framework Program approved the MycoRed project "Novel Integrated Strategies for Worldwide Mycotoxin Reduction in Food and Feed Chains", with inception date on April 2009. This 4-year collaborative project is based on integration of specific technologies in the whole food/feed chain with respect to wheat, maize, grape, nuts and dried fruits, and aimed at developing strategic solutions to reduce contamination by mycotoxins of major concern in economically important food and feed chains. Novel methodologies, efficient handling procedures and information, dissemination and educational strategies are considered in a context of multidisciplinary integration of know-how and technology to reduce mycotoxins exposure worldwide.

List of plants and related mycotoxins considered in the project:

Plant	Chain	Toxin	Fungal Genus
Maize	Food/feed	Fumonisins Aflatoxins	Fusarium Aspergillus
Wheat	Food/feed	Trichothecenes Zearalenone Ochratoxin A	Fusarium Fusarium Penicillium
Grape (including raisins and sultanas)	Food (wine)	Ochratoxin A	Aspergillus
Nuts and Dried Fruits	Food	Aflatoxins	Aspergillus

Multidisciplinary integration of know-how and technology is required to address the broad requirements for reducing mycotoxins in agro-food chains. The main consumer demands posed in the agro-food sector will drive research and technological developments within MycoRed. The need to improve prevention to minimize mycotoxins in products at different critical steps of the food chain (raw materials, storage, feed supply, food processing, final products) will be addressed by MycoRed through vertical (across food and feed chains) and horizontal (among methodologies and procedures) integration of experiences to develop a set of systems with clear breakthrough solutions to specific mycotoxicological problems.

A set of mycotoxin reduction targets of vital importance have been identified by some international food organizations, EU reports and food industry representatives (FAO, CIMMYT, EFSA, et.al.). In this respect, the knowledge and reduction of aflatoxins, trichothecenes (deoxynivalenol, nivalenol, T-2 and HT-2 toxins, etc.), zearalenone, fumonisins and ochratoxin A are the most relevant issues addressed in this project. These toxins are primary sources of both yield losses and increase of management costs worldwide. The proposed activities are not "watertight", but have overlapping areas and will be integrated through full interconnection and communication activities.

MycoRed presents an integrated vision of a reduction system as a horizontal task ensuring dissemination of different technological solutions developed by the research activities proposed in the project. Research will be conducted in targeted geographic areas with chronic, sporadic or no mycotoxin problems so that the effectiveness of the methodologies can be evaluated. The most effective strategies will then be disseminated at European and global levels.

MycoRed will implement dissemination of information and best practice education strategies to enhance the involvement of operators at all levels along food and feed chains, facilitating the participation and co-operation not only at the European but also at the global level.

The overall objectives of MycoRed are:

a) To develop novel solution driven methodologies and handling procedures to reduce both pre- and post-harvest contamination in selected feed and food chains;
b) To generate and disseminate information and education strategies to reduce mycotoxin risks at a global level. High risk areas will receive major attention by cooperation with international agriculture and food organizations and by applying the results of all technical workpackages of the project.

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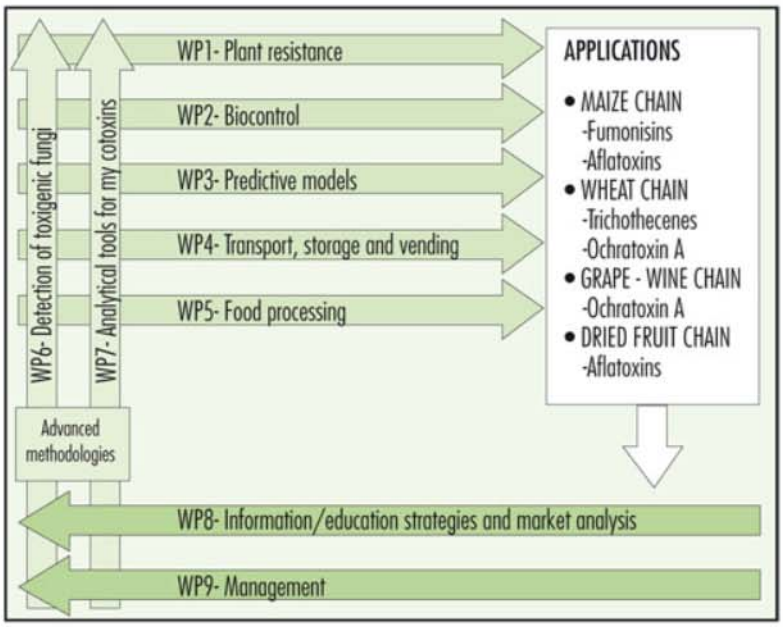

A set of specific objectives has been identified. For each specific objective, a Work Package (WP) has been developed:

WP1: Optimization of plant resistance and fungicide use with the aim to promote the mycotoxin resistance cultivar/genotype registration at the European level, to improve knowledge of plant-host interactions and the use of fungicides in a rationale way to prevent and reduce mycotoxins in maize and in wheat.
WP2: Biocontrol to reduce mycotoxins in cropping systems by preventing pre-harvest mycotoxin accumulation in crops by using microorganisms antagonist towards mycotoxin producing fungi.
WP3: Modelling and development of a Decision Support System that can predict mycotoxin risk levels in real time for various crops in different geographic areas and years. Generate data for good risk management and rationalize product usage post-harvest.
WP4: Novel post-harvest and storage handling practices to develop innovative, novel strategies for reducing mycotoxins by post-harvest and storage handling.
WP5: Novel application of food processing technologies to develop innovative and novel strategies for reducing mycotoxins.
WP6: Advanced technologies for diagnostics, quantitative detection and novel approaches to control toxigenic fungi to detect and quantify toxigenic fungi and to generate new information and novel systems to control and reduce mycotoxin biosynthesis in food commodities.
WP7: Advanced analytical tools for rapid multitoxin detection of mycotoxins and relevant biomarkers as a basis for the assessment of the reduction of mycotoxins in the food and feed chain. The WP provides analytical support to WP1-6 and aims to validate rapid and multitoxin methods, to identify metabolite profiling of toxigenic fungi and infected wheat/maize plants, and to select mycotoxin biomarkers suitable for human study.
WP8: Information, education and dissemination.
WP9: General management.
WP10: Demonstration of an "ambient intelligence", post-harvest strategies and collection of physical parameters with the aim to develop system based on sensor network for real time and/or periodic monitoring of humidity and temperature inside the silos (linked to WP4).

Coordinator:

National Research Council, Institute of Science of Food Production CNR.

The INC is participating in the following tasks:

- WP5: Food and feed processing for mycotoxin reduction. Assessing the efficacy and safety of food and feed processing procedures for reducing mycotoxin content in nuts and cereal based products.

- WP8:

- Training video for mycotoxin sampling. A video on mycotoxin sampling for food and feed regional training course will be disseminated in developing countries, mainly Africa, South America.
- Global Network, awareness and dissemination. A Delphi study on advances on reduction of mycotoxins in nuts, dried fruits, wheat and maize will be conducted in order to generate ideas and facilitate consensus among experts. Analysis and results will be presented on the website www.mycored.com.
- Dissemination of Good Agricultural Practices (GAP), Good Management Practices (GMP) and Good Storage Practice (GSP). Training programs and scientific information produced during the project will be transferred to food safety authorities and farmer organizations for effective management of mycotoxins.
- Economic evaluation of the impact of mycotoxin contamination. Expenses related to the eventual destruction and/or confiscation of goods, customs duties for incoming and outgoing material, demurrage at ports awaiting health inspections, and the cost of controls.