

# Novel integrated strategies for worldwide mycotoxin reduction in the food and feed chains

**Donor:** MycoRed Project of the Seventh Framework Program of the European Commission (EC)

**Timeframe:** 2009 - 2013

**Background:** MycoRed answers the need for a global, multidisciplinary and integrated strategy to combat mycotoxins. Novel, solution-driven strategies and procedures are needed to reduce pre- and post-harvest contamination in feed and food chains that can be linked to decision-making bodies and consumers through effective risk assessment, and information and education programs. Toxins and commodities considered in the project are aflatoxins, trichothecenes, zearalenone, fumonisins in wheat/maize food and feed chains, ochratoxin A in the grape and wheat chains, and aflatoxins in the dried fruit and maize chains. MycoRed is a consortium of a large number of European and other partners, sharing experiences and resources from several past/ongoing mycotoxin projects in a global context.



Dr. Joseph Atehnkeng (IITA) demonstrating aflasafe broadcasting to farmers (photo by IITA)

**Project summary:** MycoRed is comprised of five work packages (WPs) centered around developing novel solution driven strategies: optimization of plant resistance and fungicide use (WP1), biocontrol to reduce toxigenic fungi in cropping systems (WP2), modeling and development of a decision support system (WP3), novel post-harvest and storage practices (WP4), and application of new food processing technologies (WP5).

Two additional horizontal WPs develop methodologies for advanced diagnostics and quantitative detection of toxigenic fungi (WP6) and rapid and multi-analyte detection and quantification of mycotoxins (WP7). A horizontal WP8 covers all information, education, dissemination and demonstration activities to reduce mycotoxin risks worldwide and other knowledge of methodologies and handling procedures actually in use for particular crops and geographical areas. Finally, WP10 demonstrates the creation of an 'ambient intelligence' for real-time and periodic monitoring of mycotoxigenic fungal contamination during storage of cereals. The International Institute of Tropical Agriculture (IITA) has major involvement in WP2 and WP8, and contributed to WP3. In WP2, IITA leads the development of *Aspergillus flavus* biocontrol agents of maize in Nigeria.

## Objectives (WP2 and WP8 only)

- WP2: to prevent fumonisin formation in maize and mycotoxin formation in wheat by competitive colonization of stubbles of preceding maize crops; to reduce aflatoxin contents in nuts and maize by non-toxigenic *A. flavus*; to evaluate the economical feasibility of production and marketing of selected biocontrol agents
- WP8: to improve cooperation by transfer of knowledge to developing countries and sharing information with advanced third countries by conferences, workshops, training and short mobility missions; to identify priorities of common interest by sharing results of European research with the major international networks involved in the field of mycotoxins and toxigenic fungi; to address the evaluation of research policy at the global level through conferences focused on advanced research tools; to reinforce the consortium of international experts in the area of mycotoxins and toxigenic fungi

## Outputs (WP 2 and WP 8 only)

- WP2: possibilities of large-scale production of candidate antagonists investigated; economical feasibility of candidate biocontrol agents evaluated and potential biocontrol products selected; protocols for using antagonists in cereals; protocols for using methods that enhance naturally occurring antagonists; selected antagonists to industries for possible product development
- WP8: website; brochures and other printed material; conferences and workshops; training; mycotoxin management practices disseminated

**Major partners:** A.N. Bakh Institute of Biochemistry of the Russian Academy of Sciences (INBI, Russia), Bio-ferm (Austria), Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT), Cereal Research Company (CRC, Hungary), Consiglio Nazionale delle Ricerche (CNR, Italy), Cranfield University (CU, UK), Danmarks Tekniske Universitet (DTU), Federation Europeenne des Fabricants d'Additifs pour la Nutrition Animale (FEFANA), Institut National de la Recherche Agronomique (INRA, France), International Institute of Tropical Agriculture (IITA), International Tree Nut (Spain), Matrix (Italy), Max Rubner Institut (MRI, Germany), National Research Center (NRC, Egypt), Plant Research International (PRI, the Netherlands), Rijksinstituut voor Volksgezondheid en Milieu (RIVM, the Netherlands), Romer Labs Diagnostic (Austria), South African Medical Research Council (SAMRC), TÜBİTAK Marmara Research (Turkey), Universidad de Lleida (Spain), Universidad Nacional de Rio Cuarto (UNRC, Argentina), Università Cattolica del Sacro Cuore (UCSC, Italy), Università degli Studi di Napoli Federico II (Italy), Università degli Studi di Roma la Sapienza (Italy), Universität fuer Bodenkultur (Austria)

**Target countries:** worldwide

**Crops:** almond, apricot, fig, grape, groundnut, maize, pistachio, wheat