



## MYCOHUNT



### Rapid Biosensor for the Detection of Mycotoxin in Wheat

#### Work Package 10: Foreground and IPR management

#### D10.6. Report

### Non-confidential report on the progress to be updated every 6 months – 2<sup>nd</sup> update

**PUBLIC**

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**Prepared by:** Mr. Paul Della Tolla – Exploitation  
Manager



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## **Publishable summary**

*In this document the D10.6 Deliverable of Mycohunt project is summarized. The aim of the project is to develop a cost-effective method to detect infection of mycotoxin deoxynivalenol in wheat grains. In this deliverable, the most important activities and major findings of the M1-M12 period are summarized.*

## **Summary of the project**

The Mycohunt project aims at increasing the competitiveness of a large group of SMEs by developing a cost-effective method to detect infection of mycotoxin deoxynivalenol in wheat grains, a major threat to the food and feed sector of the European industry. A group of SME-AGs, covering the two relevant sectors and representing vast number of sector SMEs, have put together this project in order to gain knowledge and resources to further exploit the results of the novel technology proposed by providing a thorough sampling and measurement method of grain.

The economic consequences of mycotoxin infection to animal husbandry and the cost of infected crop to farmers as well as mill and storage house owners are of increasing concern while human health and safety effects are and must be addressed additionally.

## **Objectives of D10.6 deliverable**

The main objective of Work Package 10 is to ensure that the results of MycoHunt are disseminated to a wide audience half a year and to ensure the success of it beyond the project. This is achieved through a number of goals. In order to ensure that non-confidential information about the MycoHunt project and its results are disseminated to as wide and relevant an audience as possible in order to extend the impact of the project results. All consortium members are actively involved in carrying out dissemination activities and they are all contributing with their networks of contacts.



## **Progress summary of the first 12 months of MYCOHUNT**

### Achievements of Work Package 1 - Determination of MycoHunt System Specifications

Work Package 1 was successfully completed. Based on the market needs, the system specifications were determined. The outputs of this deliverable is summarized in D1.1. First, the corresponding European regulations and current methods are summarized; essential background information was provided for market analyses. The market need was examined from two sites. On one hand a questionnaire was prepared, which was sent to partners and translated to the languages of the consortium members. The answers were collected continuously and the first results are now summarized. The results of questionnaire survey will be continuously up-dated on the confidential project web page. On the other hand, the market needs were analyzed, based on the experience of consortium members and on available public information. The technical specification of the MYCOHUNT device is also provided in details herein.

### Achievements of Work Package 2 - Definition of correlation between DON in grain and DON in air/dust

The most important result of WP2 is Deliverable 2.1 - Laboratory facility for measurements. In this deliverable, the initial activities in the in-house laboratory facilities for dust collection and cleaning cereals are explained. In a second part, this apparatus is used to define particle size and amount of dust collected in fresh harvested wheat. To sum up the results, when the cleaning facility was used, approximately 1.5 % of the sample showed to be smaller than 2.5 mm and this is defined as small grains; when sieved on the vibratory system, 1.5 % of this fraction was found to be smaller than 1 mm.

### Achievements of Work Package 3 - Antibody development and characterization

One of the major output of this Work Package is Report 3.1 - DON-immunogens and DON-enzyme labels. First the strategy of the synthesis is explained, followed by a detailed method description for each steps and finally a reference is given.

Another result of Work Package 3 is Deliverable 3.2 – Immunized mice with good response.



In the report, the synthesis methods are explained, followed by the detailed analysis of the results. The immunization of mice with synthesized conjugates is discussed. In the end, a reference list is given.

Deliverable D3.3 is built further on the work performed and described in deliverable 3.1 and 3.2. To develop anti-deoxynivalenol (DON) monoclonal antibodies with enhanced selectivity and affinity, immunogens were used with the best quality. The following conjugates were already formed for immunization: DON-hemiglutaryl (HG)-bovine serum albumin (BSA), DON-blue carrier protein (BCP) and DON-cyanuric chloride (CC)-bovine serum albumin (BSA). DON-ovalbumin (OVA) and DON-CC-OVA were used as coating antigens. It should be noted that different procedures were tested to establish the condition of each reaction. The procedures for synthesis and analysis of the conjugates and linkages are prescribed in detail in "Methods and procedures" section of Deliverable 3.3.

#### Achievements of Work Package 4 – Development of the sampling unit

The activities within this Work Package has been started. The mechanical engineering design of the sampling unit has been made. The complete design will be given in M16.

#### Achievements of Work Package 5 – Immunosensor development and characterization

The activities within this Work Package has been started. The electronic design of the sensor unit was made. The complete design will be given in M24.

#### Achievements of Work Package 6 – System integration

The activities within this Work Package did not started yet.

#### Achievements of Work Package 7 – Validation of the MYCOHUNT system

The activities within this Work Package did not started yet.

#### Achievements of Work Package 8 – Guideline on prevention methods

The activities within this Work Package did not started yet.



### Achievements of Work Package 9 – MYCOHUNT training

SME and SME Association partners were trained about the correlation between the DON concentration in the wheat and the dust, about the usage of the electrical setup of the sensor unit at M9 technical meeting.

### Achievements of Work Package 10 – Foreground and IP Management

The first result of WP10 is deliverable 10.1 – Construction and maintenance of a public website. In this deliverable, the activities related to the design, creation and maintenance of the project website were summarized. It contains a public part with major information of the project as well as a restricted area for consortium members with the possibility of up and down load documents and viewing restricted information. The website is updated at every important project related event, but at least in every three month. The address of the website: <http://www.mycohunt.eu>

On 8 March 2011, the MYCOHUNT project was presented at the Embassy of Hungary in Madrid, Spain.

The invitation letter to the event:





The project poster prepared by UGENT, which was presented at the Mycotox Symposium event, which took place in Ghent on 24<sup>th</sup> May 2011.

**UNIVERSITEIT GENT** FACULTY OF PHARMACEUTICAL SCIENCES

## MYCOHUNT: Development of a Rapid, Online Biosensor for the Detection of Mycotoxin in Wheat

M. Sanders<sup>1\*</sup>, A. Galvin<sup>1</sup>, Y. Guo<sup>1</sup>, A. Heyrick<sup>1</sup>, D. De Forcke<sup>1</sup>, S. De Saeger<sup>1</sup>, A. Wootsch<sup>1</sup>, A. Udvarhelyi<sup>2</sup>, A. Agoston<sup>3</sup>, K. Ornelas<sup>4</sup>, M. Beckhous<sup>5</sup>, F. Martens<sup>6</sup>, G. Haesaert<sup>7</sup>, M. Hedström<sup>8</sup>, B. Mattsson<sup>9</sup>, A. Komar<sup>10</sup>, T. Piko<sup>11</sup>, M. Papageorgiou<sup>12</sup>, P. Vazquez<sup>13</sup>, S. Martin<sup>14</sup>, J. Martínez<sup>15</sup>, I. Panagiotou<sup>16</sup>, W. Fedak<sup>17</sup>, F. Barbi<sup>18</sup>, L. Barri<sup>19</sup>, A. Bouchlas<sup>20</sup>, O. Lopez<sup>21</sup>, J. Balmaki<sup>22</sup>, N. Marahil<sup>23</sup>

1: Ghent University, Belgium; 2: MFKK Invention and Research Center Ltd., Hungary; 3: University College Ghent, Belgium; 4: University of Lund, Sweden; 5: Hungarian Grain and Feed Association (KIFPA), Hungary; 6: Greek Association of Traders and Exporters of Cereal By-products and Feeds (SEEDYZ), Greece; 7: Confederación Española de Fabricantes de Alimentos Compuestos para Animales (CESFAC), Spain; 8: Asociación Española de Fabricantes de Masas Congeladas (ASEMAC), Spain; 9: Synagra, Belgium; 10: Union of Agricultural Cooperatives of Rethymno (EASRET), Greece; 11: Impuls Ltd, Poland; 12: OSV Srl, Italy; 13: Dunagabona Ltd., Hungary; 14: Dimitrakis S.A., Greece; 15: Evaluation Technologies, Ingénierie et Applications (ETIA), France; 16: Bioforum S.A., Greece; 17: Electrochemical Sensor and Technology Ltd (EST), United Kingdom

\*Corresponding author: Tel: +3292648127; Fax: +3292648199; E-mail: [Malcolm.Sanders@UGent.be](mailto:Malcolm.Sanders@UGent.be)

### INTRODUCTION

Mycotox is a project granted in the EU7 framework program. The project aims to increase the competitiveness of a large group of "Small and Medium Enterprises" (SME) and "Small and Medium Enterprises-Association Groups" (SME-AG) in Europe by developing a cost-effective method to detect the contamination of deoxynivalenol (DON) in wheat grains. This mycotoxin forms a major threat in the food and feed sector of the European industry. A group of SME Associations, covering the relevant sectors and representing a vast number of sector SMEs, participate in the project.

### PARTNERS AND TASKS

**SME-AG / SME**

- 1) BGFA
- 2) SEEDYZ
- 3) CESFAC
- 4) ASEMAC
- 5) Synagra
- 6) EASRET
- 7) Impuls
- 8) OSV
- 9) Dunagabona
- 10) Dimitrakis
- 11) ETIA
- 12) Bioforum
- 13) EST

→ SME-AG / SME offer advice.

**PROBLEM:**  
DON contaminated wheat

↓

Losses of costs for wheat sector SME-AGs and their SME members

**SOLUTION:**  
An easy to use cost-effective system for sampling and detection of DON contamination in wheat.

**RTD PERFORMERS**

- 1) MFKK Invention and Research Center
  - The coordination of the project.
  - The development of a sampling unit for the wheat grain and the dust.
- 2) University College Ghent
  - The sampling and characterization of the dust fraction.
  - The determination of the correlation between DON in wheat grain and in dust.
- 3) University Ghent
  - The development of monoclonal antibodies against DON with a low cross reactivity against other Trichothecenes like 3-Acetyl-DON, 15-Acetyl-DON.
- 4) University Lund
  - The development and characterization of an immunosensor for the determination of DON contamination on field. Therefore the developed monoclonal antibodies (University Ghent) will be used. For making the immunosensor, different parameters are optimized like the choice of an immobilization surface, a direct (with immobilized antibodies) or indirect (with immobilized antigen) competitive immunoreaction and good assay parameters.

### THE USE OF THE SAMPLING AND DETECTION (IMMUNOSENSOR) UNIT

A representative grain sample is taken from for example a loading ship. The dust is generated and is transported to a separate part. By clean-up a clean water sample which contains DON is obtained. This water sample can be directed to the sensor for measurement.

The immunoreaction module consists of a DON conjugate- or anti-DON antibody-coated surface, which is the region where the immunoreaction takes place. The analyte is then quantified using a reaction based on activity of an enzyme label with a specific soluble substrate. The product of the enzymatic reaction is further detected amperometrically in the detection module.

The invitation letter of the Mycotox Symposium:

## FINAL PROGRAM

### 4<sup>th</sup> International Symposium Mycotoxins: Challenges and Perspectives Tuesday May 24<sup>th</sup> 2011, Ghent, Belgium

#### INTRODUCTION

Mycotoxins -toxic fungal secondary metabolites- play a significant role in food and feed safety. Indeed, mycotoxins have shown to be the number one threat regarding chronic toxicity. Economic losses are due to effects on livestock productivity and direct losses in crop yield and stored agricultural products. Legislative limits for a range of mycotoxins continue to develop worldwide resulting in an increased number of official controls deriving from national food safety plans and for food trade purposes.

The challenges in mycotoxin research are enormous due to the frequency, the complexity and variability in occurrence. Several aspects make the control of mycotoxins difficult, e.g.:

- Different fungal species produce mycotoxins;
- Most of the mycotoxin producing fungi are able to produce more than one mycotoxin;
- Mycotoxin levels are influenced by environmental conditions during growth and storage;
- The presence of masked mycotoxins;
- Interaction of various mycotoxins and environmental factors.

New developments in mycotoxin analysis focus on faster, environmentally friendly, cost-effective and fit-for-purpose methods in food, feed, biological tissue and body fluids. A trend towards multi-mycotoxin analysis has been noticed.

Mycotoxigenic fungi, mycotoxins and food safety will continue to be a critical interest to researchers for years to come. Innovations take place at a rapid pace. The investigational area is broad (phytopathology, analytical methods, risk management, animal health, ...) but necessary to ensure a safe food and feed supply.

The symposium will bring knowledge of several disciplines together to find solutions for the problems connected with mycotoxin contamination. The complex character of mycotoxin related problems make a multidisciplinary approach necessary.

#### REGISTRATION

Please register at [www.mycotx.be](http://www.mycotx.be)  
**Regular fee:** € 175 (before March 15<sup>th</sup>); € 150  
**Fee for PhD students:** € 70 (before March 15<sup>th</sup>); € 60

After the online registration, an invoice/confirmation will be sent within 2 weeks. Registration fee includes abstract book, conference bag, coffee and lunch.  
 Eating arrangements: Blijdeboel Ghent: KMO-Pordesulle DV 0101616

#### VENUE

University College Ghent - campus Bijloke  
 Room "Zwarte zaal", Josef Klaykensstraat 2,  
 9000 Ghent

by plane:  
From Brussels Airport, Ghent can easily be reached by train "Gent Sint-Pieters" directly from the airport. Trains run very frequently with an interval of about 20 minutes and travel time to "Gent Sint-Pieters" railway station is 50 to 65 minutes.

by train/tram:  
From railway station "Gent Sint-Pieters", the venue can easily be reached with tram line 21, 22 or 40 to "Bijlokehof".



The project poster was also showcased for four days at the International FarmerExpo event held in Debrecen, Hungary 18-21 August 2011. A short interview about MYCOHUNT was also recorded at this event by Debrecen TV, which was already broadcasted eight times. The interview will be uploaded to the project website's public section.



### **Achievements of Work Package 11 – Management of the consortium**

The project started on 1<sup>st</sup> September 2010, and the kick-off meeting was held on 20-21 September 2010. The first M3 technical meeting was organized in Ghent on 30 November 2010.

The M6 project meeting was held in Madrid, Spain on 8 March 2011, organized by CESFAC and ASEMAC at their premises.

The meeting agenda:

#### **8<sup>th</sup> March, 2011., Tuesday (Diego de León 54, 5<sup>o</sup>D, Madrid)**

09:30 – 11:00 Project administrative status up-date (MFKK)  
- Consortium agreement  
- Financial matters

11:00 – 11:20 *Coffee break*

11:20 – 11:50 Achievements **WP1** (Determination of MycoHunt System Specifications) - MFKK  
- System specification  
- Content of D1.1

11:50 – 12:10 Status of **WP2** (Correlation between DON in grain and DON in air/dust) - HOGENT  
- Content of D2.1  
- Task 2.2. Simulation  
- Further work plan

12:10 – 12:40 Status of **WP3** (Antibody development and characterization) - UGENT  
- Content of D3.1  
- Content of D3.2  
- Further work plan

12:40 – 13:00 Start-up **WP4** and **WP5**  
- WP4 - MFKK  
- WP5 - ULUND

13:00 – 14:00 *Lunch*

14:00 – 14:45 Dissemination, Status of **WP9** and **WP10** - MFKK  
- Construction of project web side, content of D10.1  
- Public report, content of D10.2  
- Dissemination actions, MYCOTOX symposium  
- Further work plan

14:45 – 15:00 Schedule of next meetings, any other business, and opened discussion





The M9 Project meeting was hosted by UGENT in Gent at Faculty of Pharmaceutical Sciences (Harelbekestraat 72, Ghent) on 25th May 2011.

The agenda of the meeting:

## MYCOHUNT

Grant Agreement No: 243633

### M9 Meeting, Gent, Belgium

#### AGENDA

##### 24<sup>th</sup> May, 2011, Tuesday

- 8:15 Meet at reception of Hotel Ibis Opera to go to the place of the Symposium  
18.15 – 19:30 boat trip through the historical center of Gent  
19:30 Pre-meeting dinner in restaurant Pakhuis (Schuurkenstraat 4, Ghent)

##### 25<sup>th</sup> May, 2011, Wednesday, Faculty of Pharmaceutical Sciences (Harelbekestraat 72, Ghent)

- 9:45 A taxi will pick you up at Hotel Ibis Opera  
10:00 – 10:15 Project status up-date, administrative issues (MFKK)  
10:15– 10:30 Project technical status update  
- Deliverables submitted  
- Past and coming tasks  
10:30 – 11:15 Status of **WP2** (Correlation between DON in grain and DON in air/dust) - HOGENT  
- Results of simulation (task 2.2)  
- Status of comparative measurements (task 2.3)  
- Further work plan  
11:15– 11:30 *Coffee break*  
11:30 – 12:15 Status of **WP3** (Antibody development and characterization) - UGENT  
- Status of immunization (task 3.2)  
- Status of cell fusion (task 3.3)  
- Further work plan  
12:15 – 12:30 Status of **WP4** - MFKK  
- Status of development of dust collection unit (task 4.1)  
- Further work plan  
12:30– 12:45 Status of **WPs** - ULUND  
- Ideas for antibody selection task 5.1  
- Further work plan  
13:00 – 14:00 *Lunch*  
14:00– 14:45 Visiting Ghent University laboratories  
14:45 – 15:30 Status of other WPs  
- Status of **WP9** and **WP10** – MFKK  
- opened discussion  
15:30 – 15:45 Schedule of next meetings, any other business