COCERAL MYCOTOXINS SURVEY: SYNTHESIS REPORT 2009

Results of the Mycotoxins survey
carried out among COCERAL's operators

August 2010

REGULATORY POSITION

Foodstuff: The European Regulation n.1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuff has been modified (mainly in the settled levels) several times, the latest on February 2010 as regards Aflatoxins Maximum Limits (Commission Regulation (EU) No.165/2010).

The Commission is currently discussing the possibility to set up a new proposal for both food and feed H2 and HT2 toxins.

Feedingstuff: Commission Recommendation of 17 August 2006 on the presence of Deoxynivalenol, Zearalenone, Ochratoxin A, T-2 and HT-2 and fumonisins in products intended for animal feeding. Commission Directive 2002/32/EC on undesirable substance in animal feed (regarding Aflatoxin B1 in feed materials).

Lately, during the 7th Fusarium toxin forum, the Commission introduced the possible revision of the European recommendation 2006/576/EC as regards the assessment of the approach for managing mycotoxins in feed as well as the review of the guidance level for Deoxynivalenol (DON) and Zearalenone (ZEA).

The table here below summarizes, respectively, the limits set up and those recommended by the recalled legislation:

Table 1: Summary of Mycotoxins Recalled Legislation

Mycotoxins		Foodstuff Regulated maximum levels	Feedingstuff Recommended guidance values
STORAGE MYCOTOXINS	Aflatoxins (Sum of B_1, B_2, G_1, and G_2)	- **4ppb** and **2ppb** (B1) and for Cereals and products derived from cereals (excluded maize, rice and processed cereal products and dietary foods for infants); - **10 ppb** and **5 ppb** (B1) Maize and Rice; - **0.1 ppb B1** for Processed cereal-based foods and baby foods for infants and young children.	20 ppb
	OTA (Ochratoxin A)	- **5 ppb** for unprocessed cereals; - **3 ppb** all products derived from unprocessed cereals.	250 ppb
FIELD MYCOTOXINS	DON (Deoxynivalenol)	- **1250ppb** for unprocessed cereals other than durum wheat, oats and maize (rice is excluded from "unprocessed cereals"); - **1750 ppb** for unprocessed durum wheat and oats; - **1750 ppb** for unprocessed maize with the exception of unprocessed maize intended to be processed by wet milling (starch production).	8 000 ppb (12000 ppb for maize by-products)
	ZEA (Zearalenone)	- **100 ppb** for unprocessed cereals other than maize; - **350 ppb** for unprocessed maize with the exception of unprocessed maize intended to be processed by wet milling (starch production).	2 000 ppb (3000 ppb for maize by-products)
	FUMONISINS B1+B2	- **4000 ppb** for unprocessed maize with the exception of unprocessed maize intended to be processed by wet milling (starch production).	60 000 ppb for maize and maize products
	T2 and HT2	Under discussion	Under discussion

INTRODUCTION

This report aims to show the results of a biannual survey carried out by COCERAL members on the management of mycotoxins.

COCERAL is considered as the voice representing the European cereals, rice, feedstuffs, oilseeds, olive oil, oils and fats and agrosupply trade. COCERAL members act in the food and feed supply chain, both at the level of agrosupply distributors and grain traders (Figure 1).

The agrosupply section is composed of specialised technicians who advise farmers all along the production cycle on the choice of seed varieties and the conditions of use of fertilizers and plant protection products taking into account the local conditions (environmental, pedo-climatic, economics, etc.). Agrosupply distributors inform farmers also on the time of intervention on the crop, on the role of meteorological conditions, on the correct dosage for the chosen product.

Grain collectors and international traders intervene after the grain is harvested. Collectors sample and analyze the crops before reception. Then they dry, clean and protect the grain from insect infestations in order to adapt the crops to both the regulatory requirements and the commercial contracts.

Agrosupply distributors and grain trading operators contribute to manage and control mycotoxins in the batches traded within European Member States.

This report will highlight which tools and actions are put in place to prevent and control the risk of mycotoxins by agrosupply distributors and grain traders.

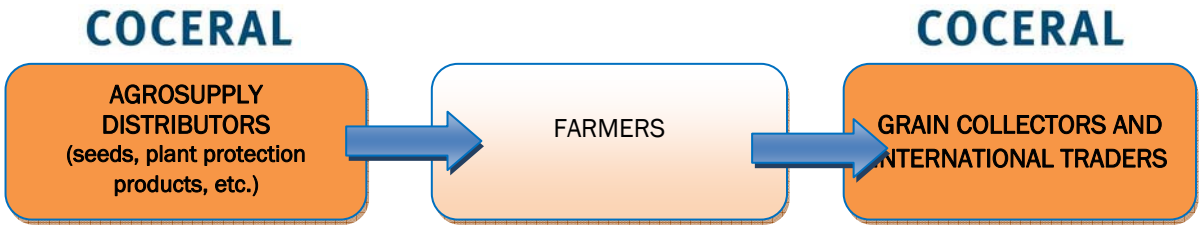


Figure 1 Composition of the food and feed supply chain. COCERAL members act before and after the farmers as agrosupply distributors and grain collectors and international traders.

SURVEY DESIGN

- **Population of concern**
  - European agro supply distribution and grain trading companies;
  - The Member states that have participated to the survey are the following: Belgium, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Portugal, Sweden, and UK.

- **Selected sample**
  - The population sample has been chosen based on its relative ease of access. Therefore for convenient reasons and data availability operators from the Member States who replied to the survey are members of national associations of COCERAL;

- **Inquiry setting**
  - Operators have been consulted via a questionnaire (see Annex 1) sent them by email;
  - The inquiry has been launched on 20th August 2009 and closed on 20th September 2009;
  - Coceral Secretariat received 50 replies.

The description of the method design can be found in Annex 2.

STARTING DATA

- The survey staring data has been collected through the questionnaire. Each operator was asked to underline the grain traded on a yearly basis and the number of farmers with whom each operator is dealing;
- All data received by operators of the same Member State have been aggregated.

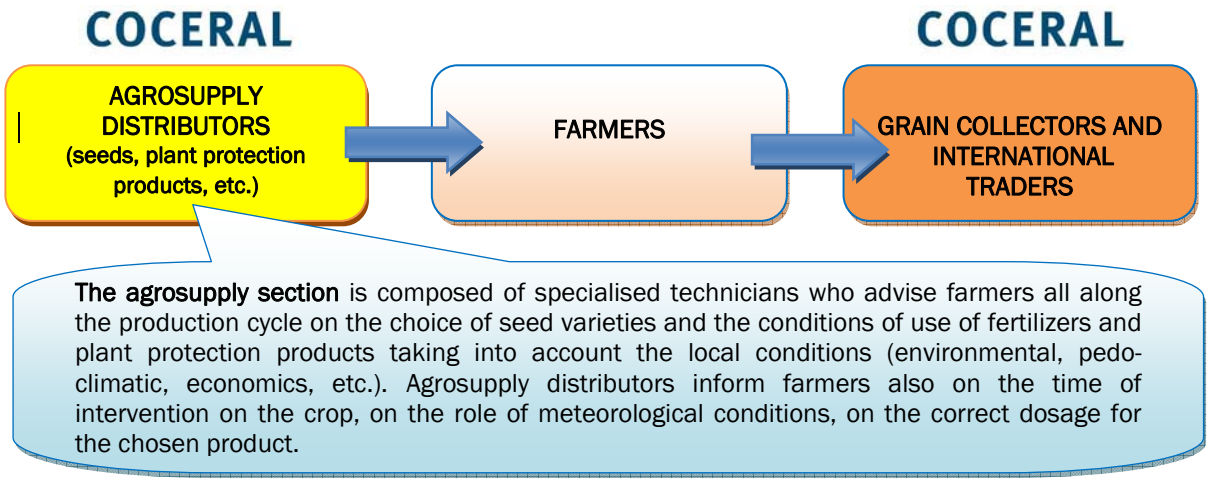
- **Volume of traded grains**
  - The volume of traded grains is composed by the volume collected from European farmers and grains imported into the European Union;
  - Results of parts 2 and 3 of the questionnaire are expressed proportionally to the total volume of grains traded within each member state.

- **Number of farmers**
  - It has been asked to each operator to underline the number of farmers with whom they are dealing with;
  - Results of part 1 of the questionnaire are expressed proportionally to the total number of farmers within each member state.

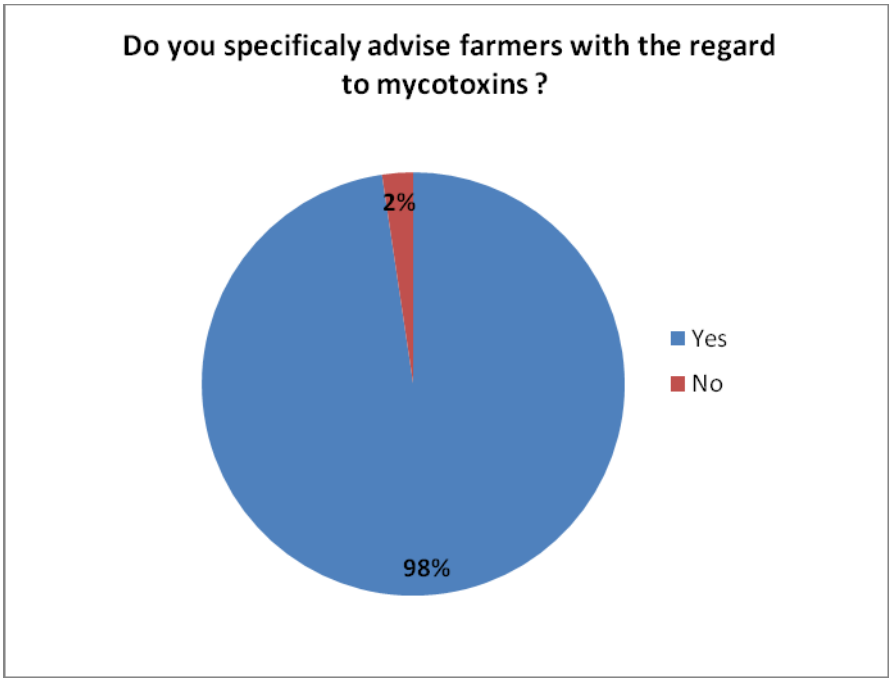
Contents

1 Prevention of mycotoxins risk in field

This section refers to the agrosupply section members of COCERAL.

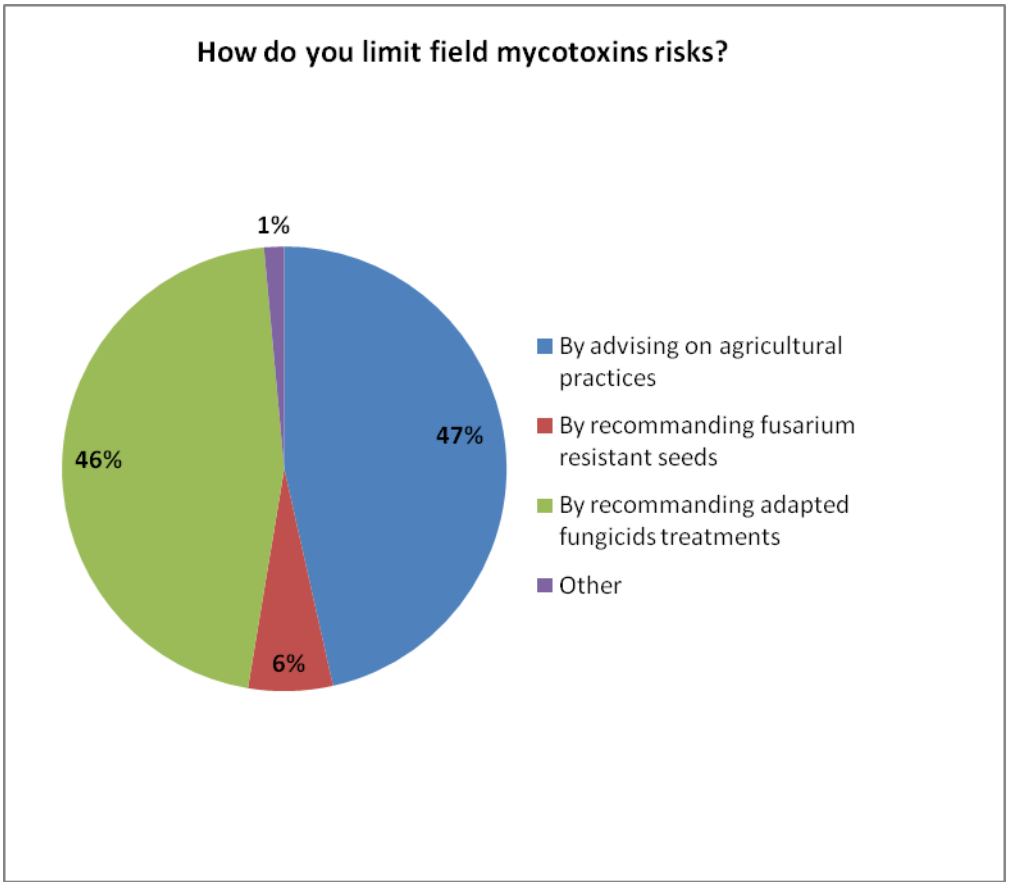


1.1 Do you specifically advise farmers with regard to mycotoxins?



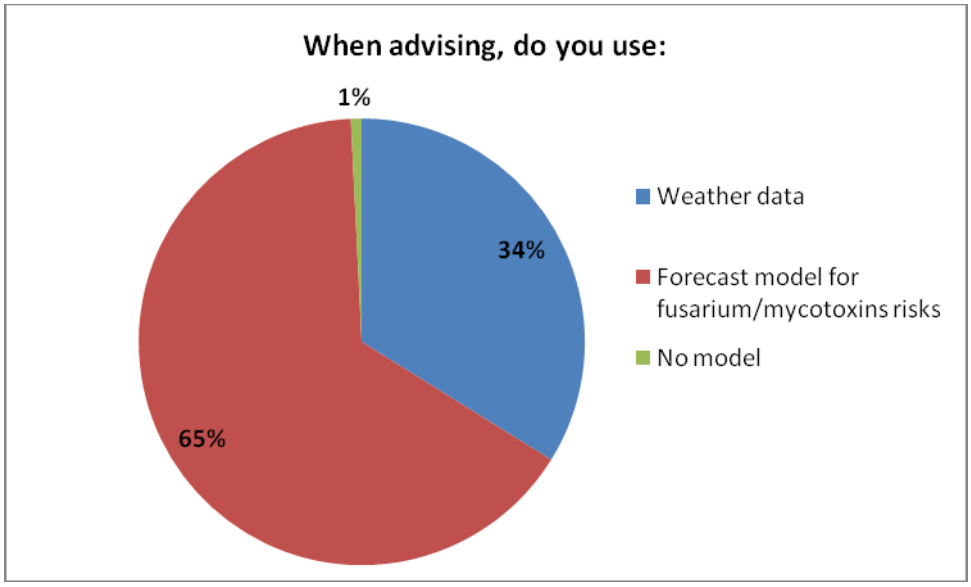
98% of agrosupply distributors do advise farmers on all the practices aimed at minimizing the risk of mycotoxins development on cropland. This is a key responsibility that COCERAL members take so to contribute to the management of mycotoxins in field.

1.2 How do you limit field mycotoxins risks?

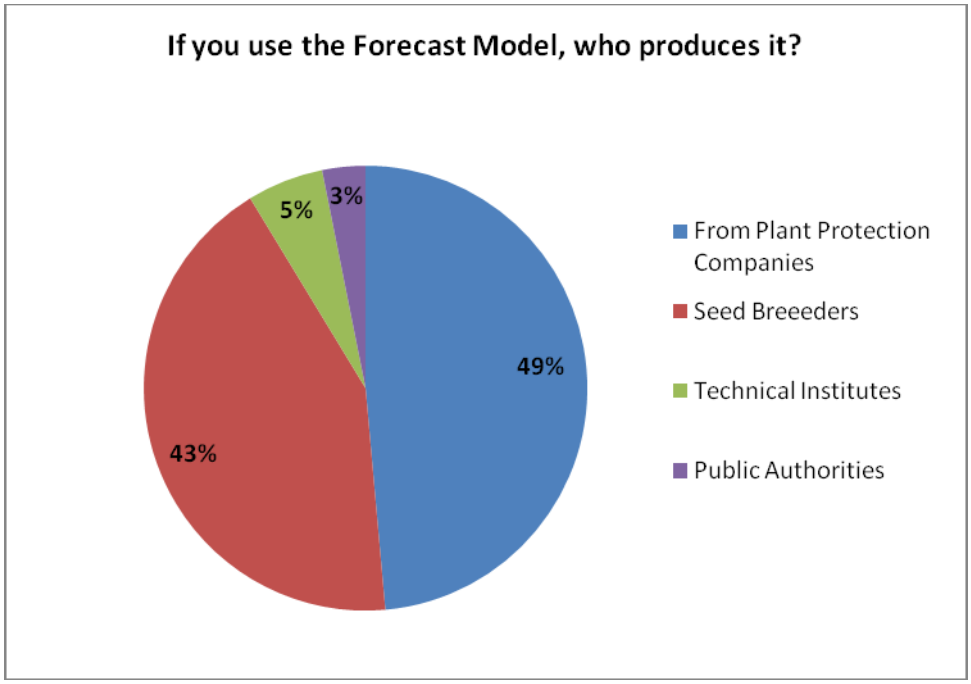


The agrosupply distributors encourage the seed and pesticide industry to improve the exchange of information concerning seed varieties and pesticide treatments developed for preventing mycotoxins risks in field. For instance, the knowledge on the resistance characteristics of seed varieties to *fusariosis* is very important information that agrosupply distributors can pass on to the farmers. When prevention is such a crucial step as in the mycotoxins issue, collaboration between the agricultural input producers, agrosupply distributors and farmers becomes imperative.

1.3 When advising, do you use:



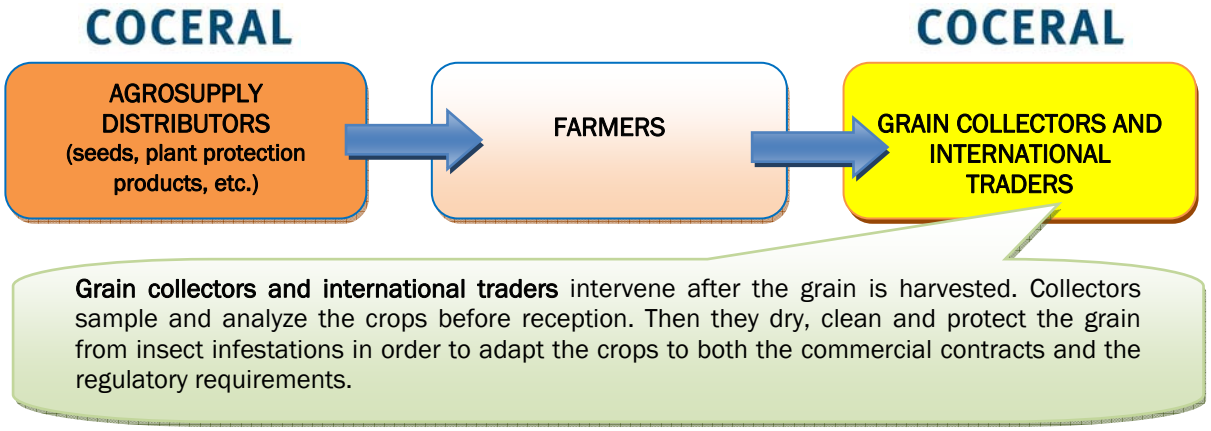
1.3.1 If you use the Forecast Model, who produces it?



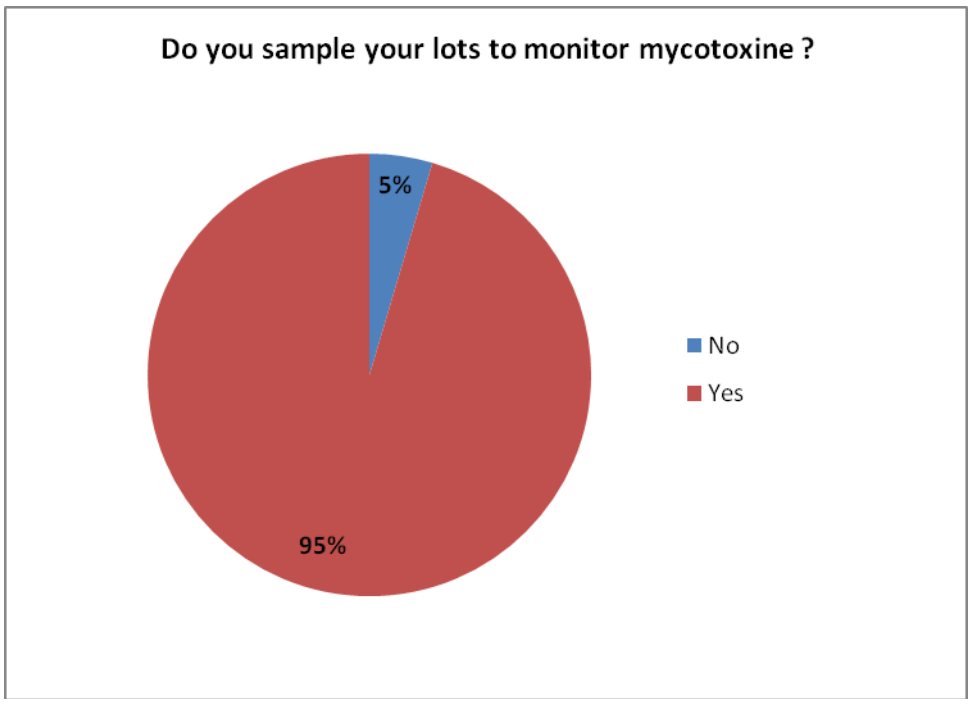
This chart refers to the 65% of operators (as in the previous chart) using weather data for formulating advices to farmers. However, it should be noted that whilst there is a wide choice of forecast models for wheat and barley, the situation is not as good for maize, for which fewer forecasting tools are available.

2 Sampling, detection and analysis

This section refers to grain collectors and international traders members of COCERAL.

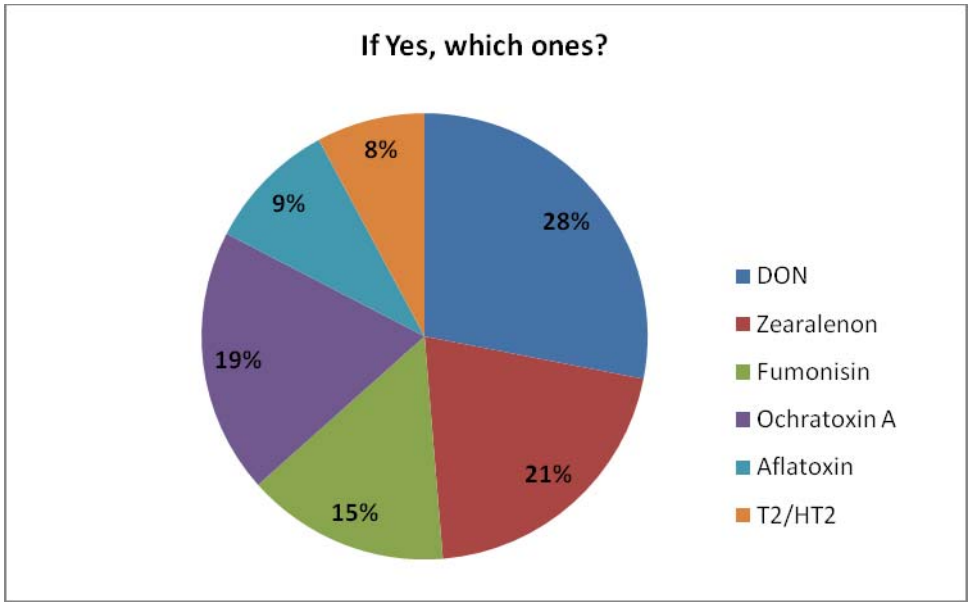


2.1 Do you sample your lots to monitor mycotoxins?



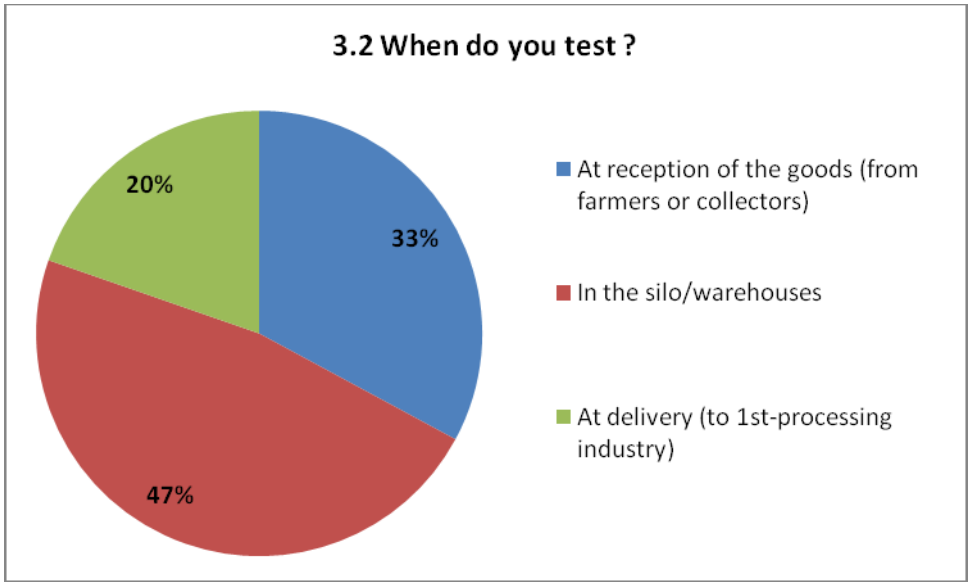
This result highlights the extent of the level of control that operators put in place for mycotoxins detection.

2.1.1 If yes, which ones?



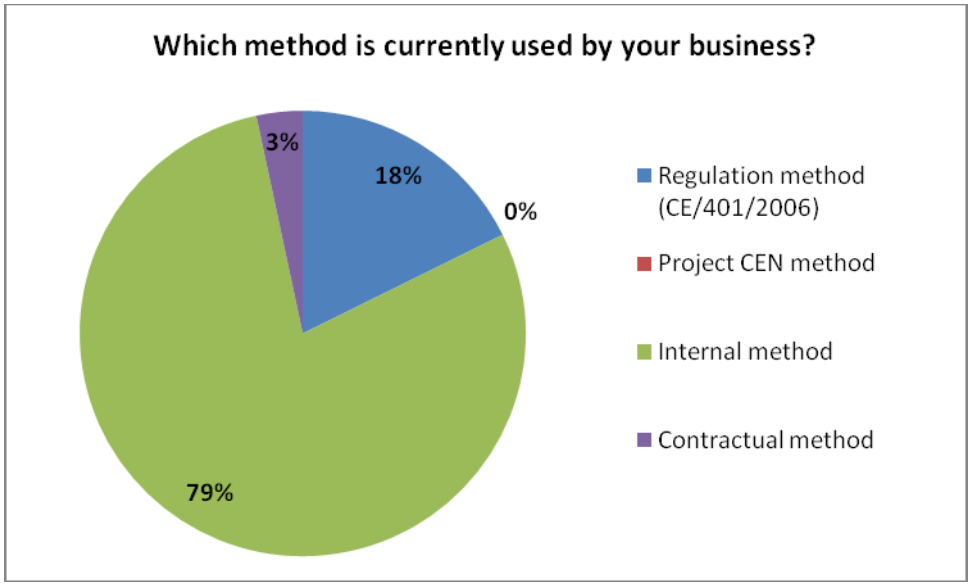
It should be noted that not all crops were necessarily analyzed on all the above toxins.

2.2 When do you test?



Testing may happen at more than one of the points mentioned above; therefore it is likely that one lot is tested more than once. Analysis can also be carried out before harvest by using the forecast models widely used by agrosuppliers (see 1.3 and 1.3.1), and through rapid detection tools at reception of the goods, and again when collectors deliver to first-processing industries.

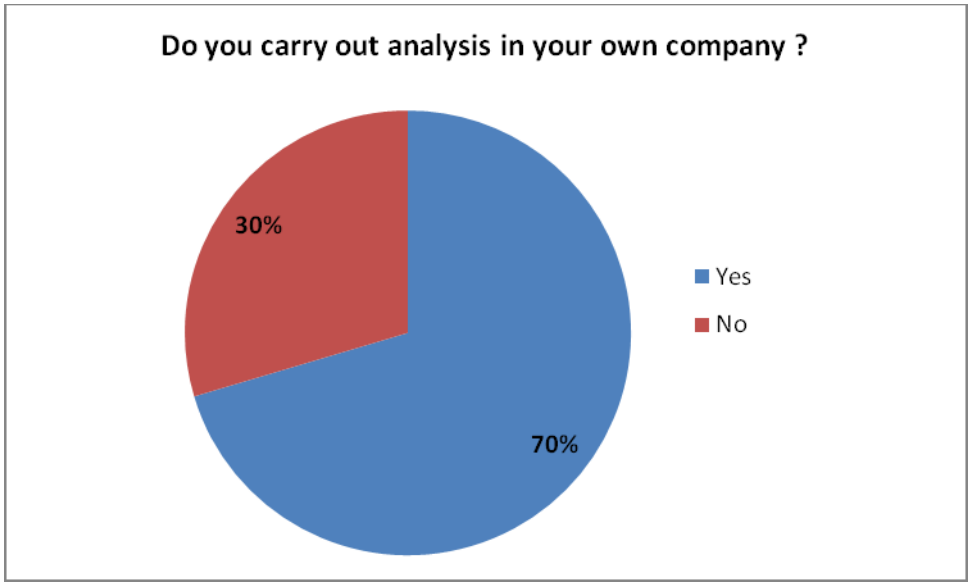
2.3 Which sampling method is currently used by your business?



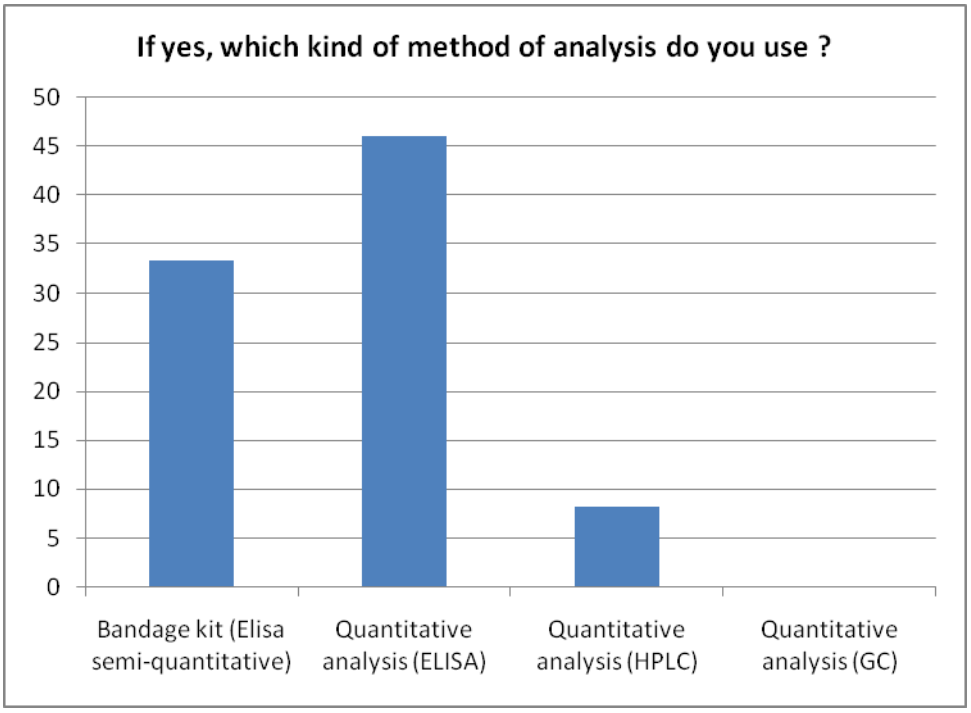
In the last two years we have seen a fluctuation in the use of different methods of analysis used by operators due to a lack of standardized sampling protocol. Recently the CEN 24333 sampling standard has been published and this should bring more homogeneity in the process of analysis which we expect to see as of the next survey.

2.4 Internal analysis

2.4.1 Do you carry out analysis in your own company?



If yes, which kind of method of analysis do you use? (At company level)



2.5 Analysis carried out externally

2.5.1 Do you carry out external analysis?

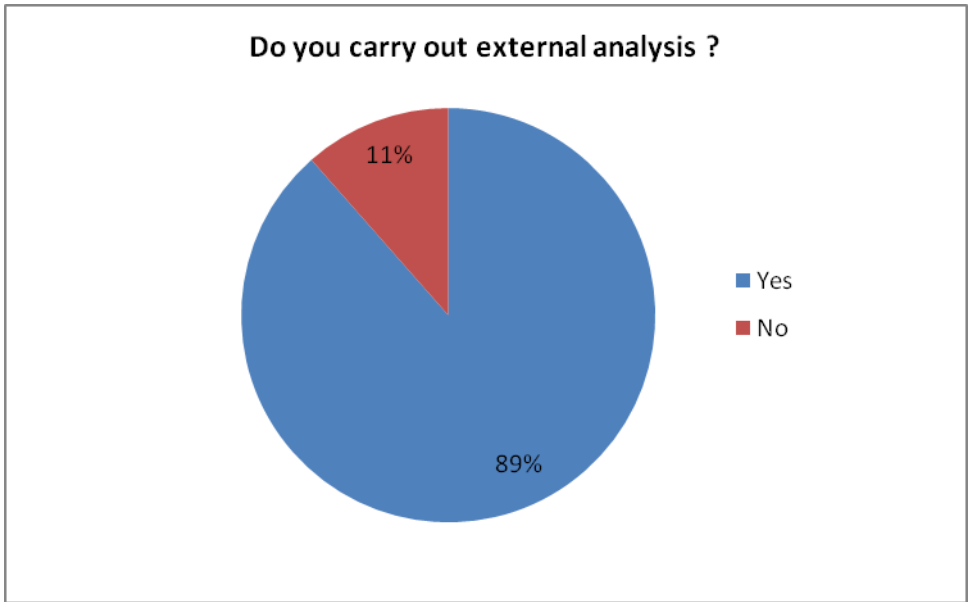
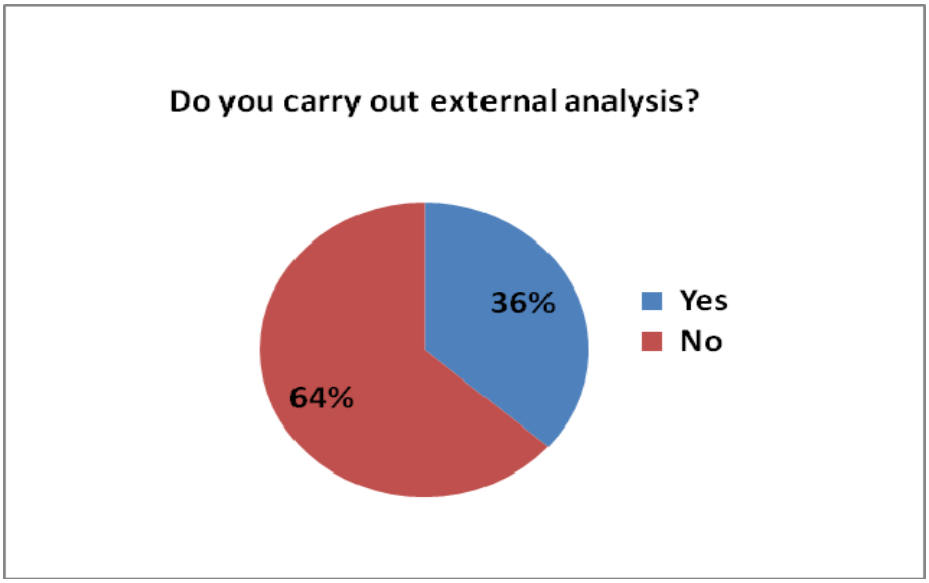
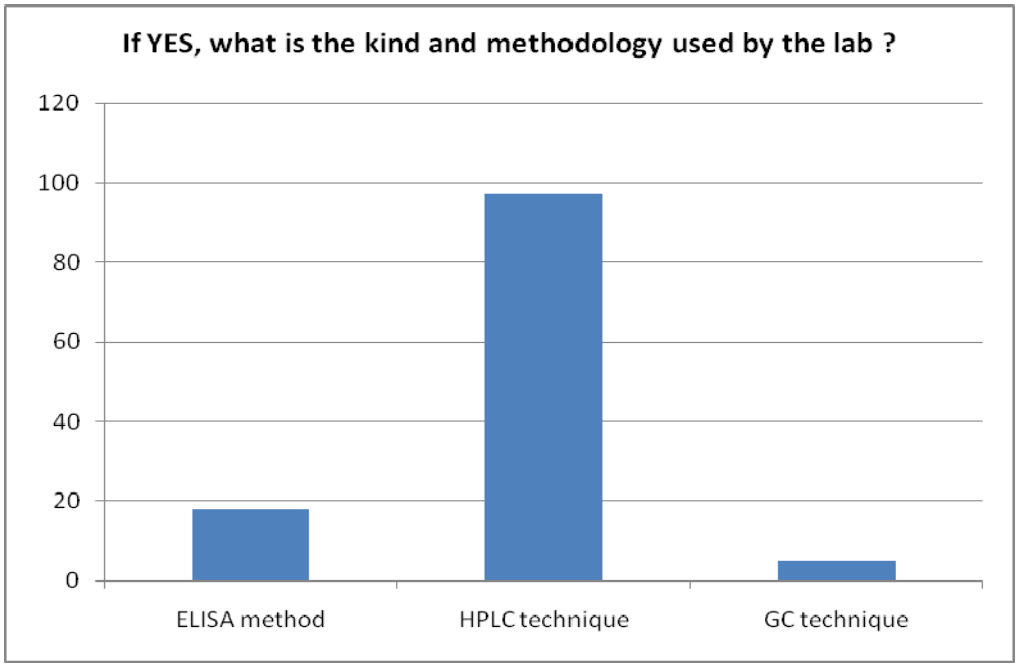


Chart: Survey 2007

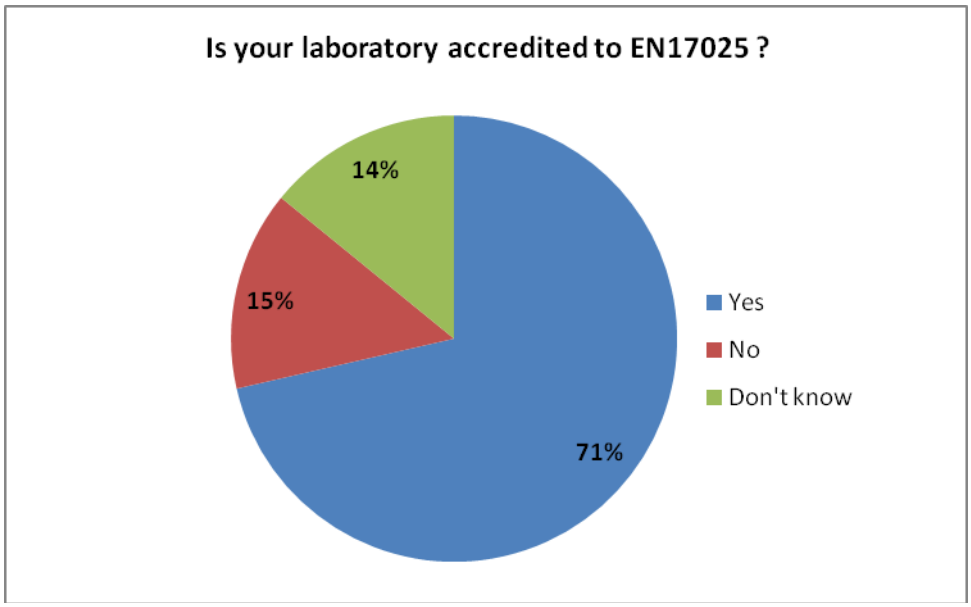


If YES, what is the kind and methodology used by the lab?



Compared to the 2007 survey, the use of Elisa method in external labs has significantly decreased. This can be explained by the fact that Elisa test kits are becoming cheaper and cheaper, thus allowing operators to use this method when performing analysis internally.
Operators need reliable analysis result to decide if lots respect food and/or feed requirements. We can see that external labs are used to verify internal detection results realized by operators (through Elisa kit).

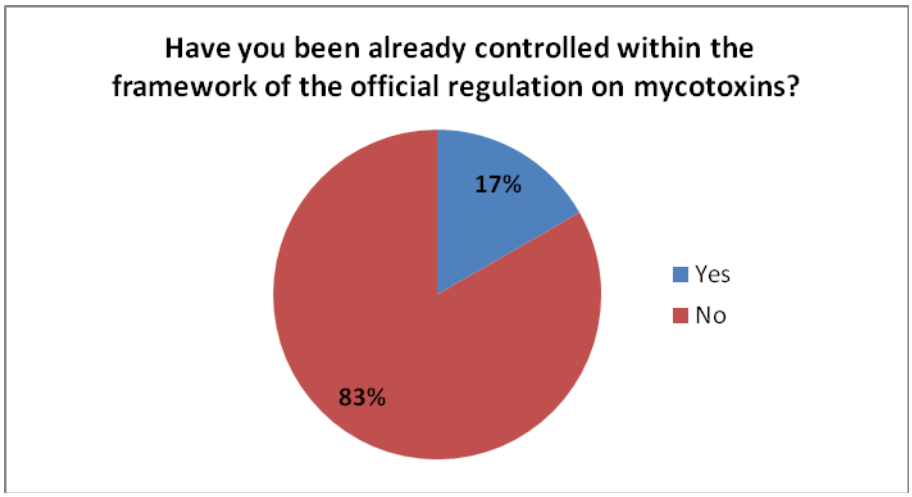
2.5.2 Is your laboratory accredited to EN17025?



In 2007 only 15% of the laboratory were accredited EN17025. The dramatic increase in the last two years (up to 71%) is positive sign also thank to the fact that accredited laboratories must publish the level of uncertainty linked to the analysis they perform. This enhances the level of transparency and the comparability of analysis results.

3 Regulation enforcement and controls

3.1 Have you been already controlled within the framework of the official regulation on mycotoxins?



3.2 Further to exceeded regulatory limits, did you have to recall a lot?

3.2.1 …further to an official control

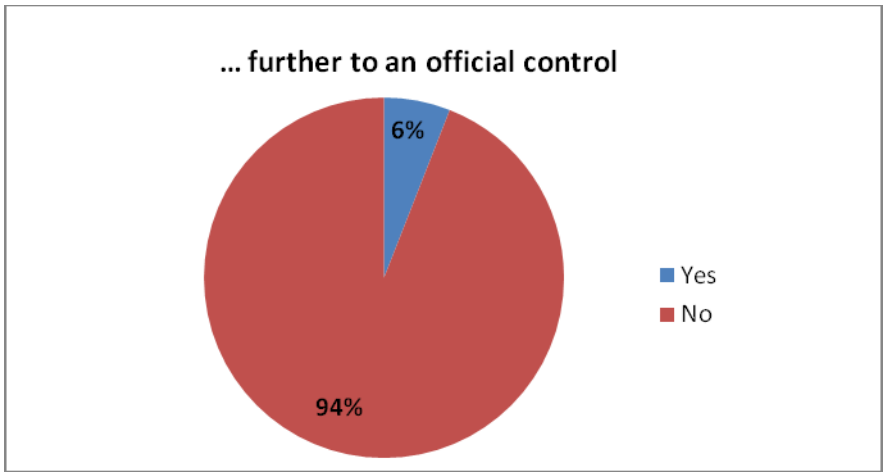
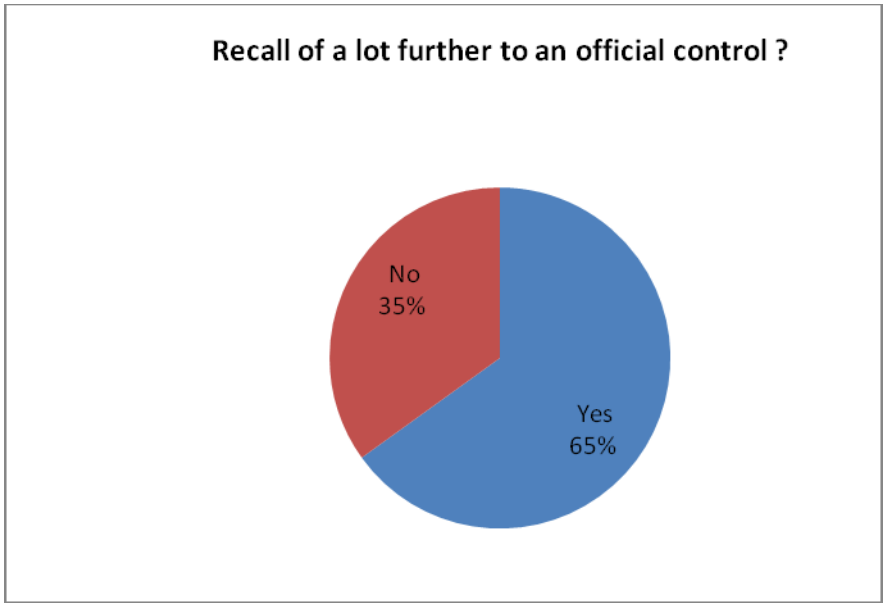


Chart: Survey 2007



3.2.2 …further to an internal control or a customer's complaint

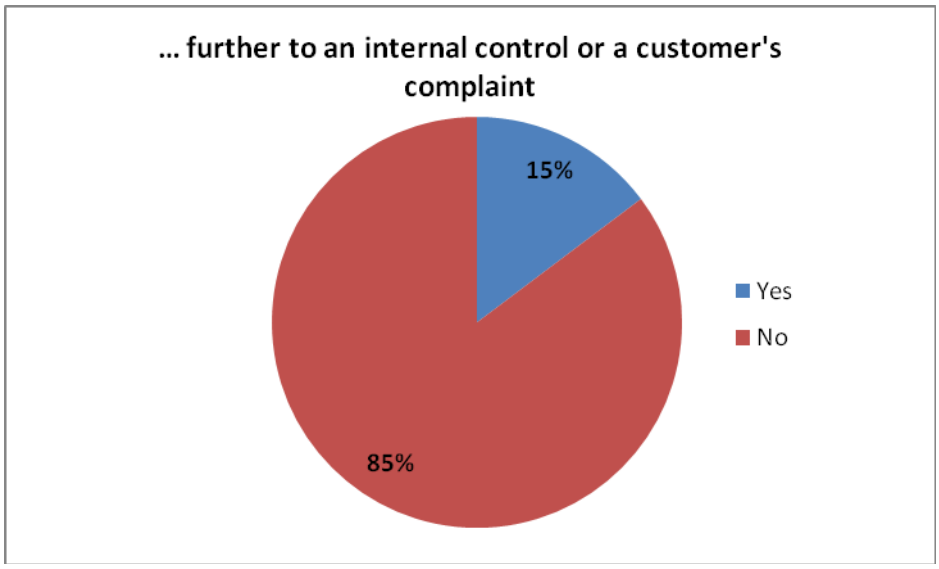
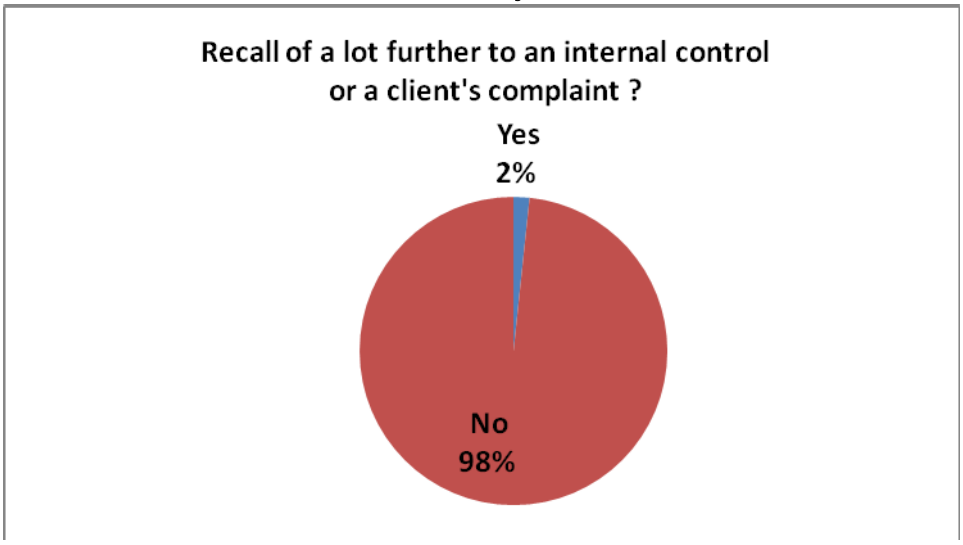


Chart: Survey 2007



ANNEX 1: QUESTIONNAIRE "MYCOTOXINS" FOR STAKEHOLDERS

YOUR COMPANY (several possibilities)

☐ **Advises and sells** seeds and Plant Protection Product (PPP) (see Part 2)

➥ To how many farmers: .....

☐ **Collects from farmers** (see Parts 3 et 4)

➥ Collected volume (2008/2009 m.y.): ..... tons

☐ **Imports grains** into the EU (see Parts 3 et 4)

➥ Imported volume (2008/2009 m.y.): ..... tons

1. PREVENTION OF FIELDS MYCOTOXINS RISKS

1.1 Do you specifically advise farmers with regard to mycotoxins?

☐ YES (if yes, please go to question 2.2.)
☐ NO (if no, please go to part 3)

1.2 How do you limit field mycotoxins risks?

☐ By advising on agriculture practices (till, former crops...)
☐ By recommending Fusarium resistant seeds
☐ By recommending adapted fungicides treatments
☐ other (please specify):_____

1.3 Do you sell the recommended seeds or fungicides?

☐ Yes
☐ No

1.4 When advising, do you use:

☐ Methereological data
☐ A forecast models for Fusarium or mycotoxins risk
☐ No model

1.4.1 If you use the Forecast Model, who proposes it?

☐ Plant protection companies
☐ Seed breeders
☐ Technical institutes
☐ Public authorities
☐ No model

2 SAMPLING, DETECTION AND ANALYSIS

2.1. Do you sample your lots in order to monitor mycotoxins

☐ NO : (if No, please go to part 4)
☐ YES:

2.1.1 If Yes, which ones?

☐ DON
☐ Zearalenon
☐ Fumonisins
☐ Ochratoxin A
☐ Aflatoxin
☐ Toxin T2/HT2

2.2. When do you test?

☐ at reception of the goods (from farmers or collectors)
☐ in the silo/warehouses
☐ at delivery (to first-processing industry)

2.3. Which method is currently used by your business?

☐ Regulated method (EU Reg. n.401/2006 laying down the methods of sampling and analysis for the official control of the levels of mycotoxins in foodstuffs or future SANCO method for big lots)
☐ CEN method (project EN/ISO 24338);
☐ Internal method*
☐ Contractual method*

*Please, give a short description (or send a full description)

_____
_____
_____

2.4. Internal analysis carried out in your enterprise

2.4.1. Do you carry out analysis in your own company?

☐ yes
☐ no

If YES, which kind of method of analysis do you use?

- ◘ Bandage kit (Elisa semi-quantitative)
- ◘ Quantitative analysis (Elisa)
- □ Quantitative analysis HPLC
- □ Quantitative analysis (Chromatographie en Phase Gazeuse-GC)

2.5 Analysis carried out externally

2.5.1 Do you carry out external analysis?

- ☐ yes
- ☐ no

If YES, what is the kind and methodology used by the lab?

- □ Elisa method
  - □ Standardized method. Which one_____
  - □ Internal method. Which one_____
- □ HPLC technique
- □ GC technique

2.5.2. Is your laboratory accredited to EN 17025?

- □ Yes
- □ No
- □ I don't know

If YES, on which programme(s)?_____
_____

3. REGULATION ENFORCEMENT AND CONTROLS

3.1. Have you been already controlled within the framework of the official regulation on mycotoxins?

- ☐ Yes
- ☐ No

If YES, by whom? (Please, indicate by which public service)

_____

_____

3.2. Did you have any problems or sanctions?

- ☐ Yes
- ☐ No

If YES, which one(s)?

_____

_____

3.3 Further to exceeded regulatory limits, did you have to recall a lot?

3.3.1. ...further to an official control

- ☐ Yes
- ☐ No

3.3.2. …further to an internal control or a customer's complaint.
- ☐ Yes
- ☐ No

3.3.3. **If YES** to 3.3.1 or 3.3.2 were you covered by insurance?
- ☐ These guaranty is already included in your actual contract
- ☐ You need to add a specific guarantee in your contract
- ☐ Your insurance company exclude this risk

Other comments on mycotoxins

_____

_____

_____

ANNEX 2: METHOD DESIGN

- **Method design**
  - The replies (elementary results) sent by the operators are processed on an equal basis, regardless of the volume traded by these operators and number of farmers;
  - The allocation of the results represents the practices of operators of the concerned Member State: they can then be applied (extrapolated) to the whole members of a national association of COCERAL (for the concerned activity: agrosupply distribution, domestic trade and import/export);
  - The results applied to the national level are weighted according to the volume of grains[1] traded/number of farmers within the Member State for a given activity divided by the volume of grains traded/number of farmers within the Member States participating in the survey.

- **Calculation formula**

$$Answer_{COCERAL} = \sum_{MS} \frac{V_{MS}}{V_{allMS}} \times \frac{Answer_{Questionnaire}}{Answer_{Sample}} \times V_{MS}$$

$$Answer_{COCERAL} = \sum_{MS} \frac{F_{MS}}{F_{allMS}} \times \frac{Answer_{Questionnaire}}{Answer_{Sample}} \times F_{MS}$$

Where:

- V_{MS} et V_{allMS} = Volume of traded grains by Member State (domestic trade and import/export)
- F_{MS} et F_{allMS} = Number of farmers by Member State
- $Answer_{Questionnaire}$ and $Answer_{Sample.}$ = Answers to the questionnaire

MYCOTOXINS SURVEY 2007

COCERAL has published a related Mycotoxin survey in 2007. The aim of that inquiry was to underline how trading operators control mycotoxins in the batches traded within the Member States participating in the survey (Austria, Belgium, Denmark, France, Germany, Italy, Poland, Portugal, Spain, Sweden, and UK).

Therefore, when it is possible, a comparison between the results of the two analyses would be performed.

[1] The volumes of grains have been considered without differentiate between grains for human consumption and for animal consumption.