COCERAL MYCOTOXINS MANAGEMENT SURVEY: SYNTHESIS REPORT 2025

Results of the mycotoxins management survey carried out among COCERAL members

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INTRODUCTION

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

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

Agrosupply distributors often advise farmers all along the production cycle - on the choice of seed varieties and the of use of fertilisers and plant protection products, also considering the local conditions (environmental, pedo-climatic, economics, etc.). Many agrosupply distributors also provide information about the time of intervention on the crop, the role of meteorological conditions, or the correct dosage for the chosen product.

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

Agrosupply distributors and grain trading operators contribute to the management and control of mycotoxins in the batches traded within European Member States and the United Kingdom.

This report highlights which tools and actions are put in place to manage the risk of mycotoxins development by agrosupply distributors and grain traders.

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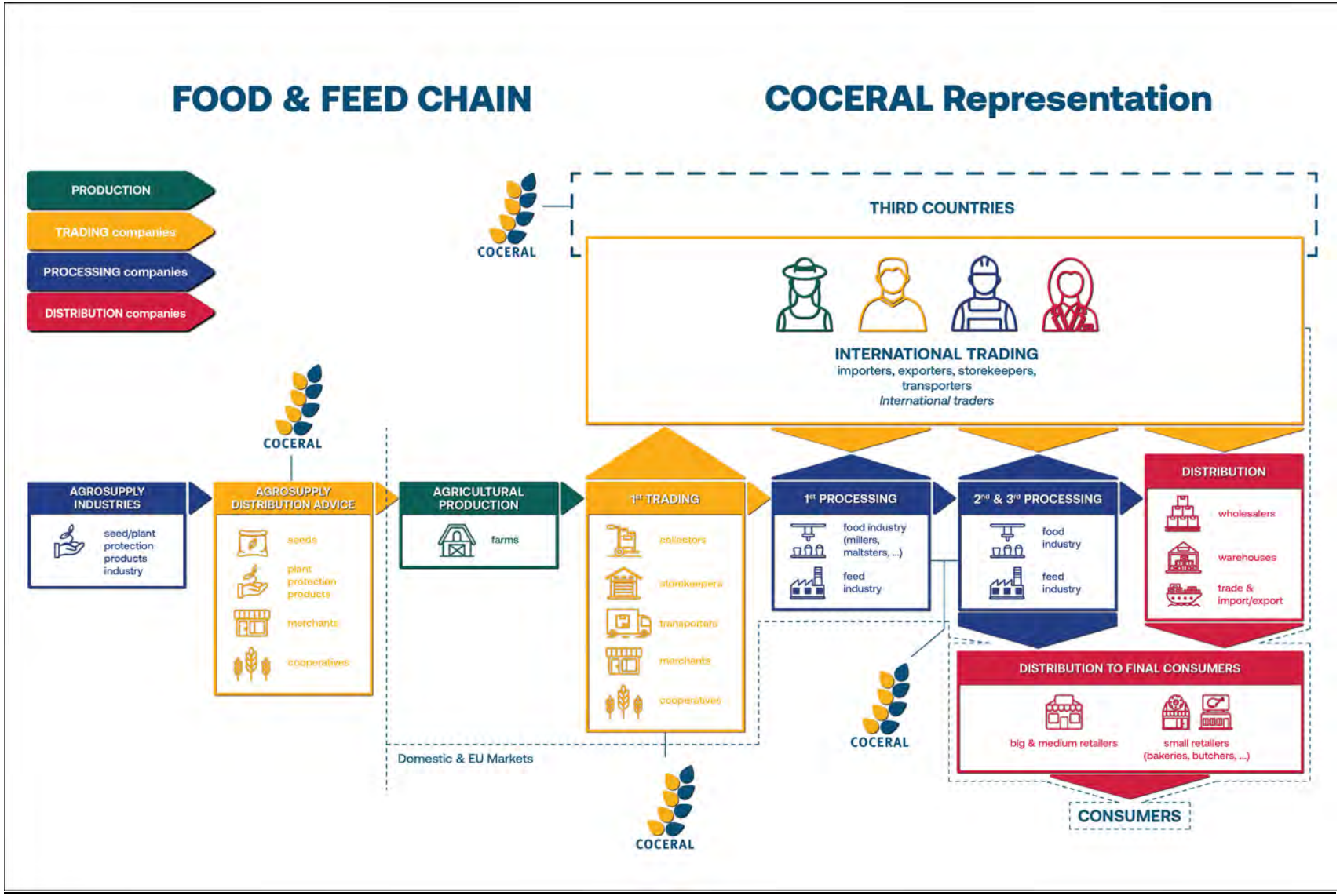

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SURVEY DESIGN

- **Population of concern**
  - The operators who replied to the survey are members of national associations of COCERAL, which are agrosupply distributors and grain collecting/importing/trading companies from Europe and the United Kingdom (UK).
  - The survey includes replies from Belgium, Bulgaria, Czech Republic, France, Finland, Germany, Hungary, Ireland, Italy, Poland, Romania, Spain, the Netherlands, and UK.

- **Enquiry setting**
  - Operators have been consulted via a questionnaire (see Annex 1), made available online
  - The enquiry was launched on 31 October 2025, and it was closed on 15 April 2026
  - The COCERAL Secretariat received 37 replies, covering a total volume of traded grains of around 86 million tonnes (equivalent to more than 27% of total EU+UK market share).

The description of the method for processing the replies can be found in Annex 2.

- **Starting data**
  - The survey starting data was collected through the online questionnaire. The participants were asked to specify the volume of grain traded on a yearly basis and the number of farmers the operator is dealing with
  - All data received from operators from the same Member State (and UK) were aggregated.

- **Volume of traded grains**
  - The volume of traded grains is composed of the volume collected from European and UK farmers and of grains imported into the European Union and UK
  - The results of the questionnaire are expressed proportionally to the total volume of grains traded within each Member State (and UK)
  - The external data on EU imports and intra-EU trade is sourced from Eurostat
  - The external data on UK imports and intra-UK trade is sourced from the UK Government (DEFRA).

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EXECUTIVE SUMMARY

Preamble:

Mycotoxins are toxic secondary metabolite that are naturally produced by different types of fungi (i.e., *Aspergillus* spp, *Penicillium* spp, *Fusarium* spp, and *Claviceps* spp). Mycotoxins might enter the food chain because of infection of crops before (field mycotoxins) or after harvest (storage mycotoxins) and are typically found in cereals and oilseeds, meant for human and animal consumption.

"*The presence of mycotoxins in food and feed may cause adverse health effects in humans and animals, ranging from gastrointestinal and kidney disorders to immune deficiency and cancer.*

Exposure to mycotoxins can happen by eating contaminated foods or from animals that are fed contaminated feed. Since temperature and humidity are important parameters for the growth of fungi, climate change is anticipated to impact on the presence of mycotoxins.

EFSA collects and evaluates occurrence data on mycotoxins in food and feed. EFSA provides risk managers with scientific advice to inform their decision-making on the setting of maximum levels of mycotoxins in food and feed. It looks at the related risks posed to human and animal health and may set Tolerable Daily Intakes for various mycotoxins.

EFSA's designed experts assess human and animal exposure using occurrence data, including exposure for specific population groups and for different animal species (such as farm animals, fish and pets). EFSA ensures the continuity of data collection on mycotoxins, integrating newly generated occurrence data into existing databases and supporting the creation of new ones." Source: EFSA.

After EFSA risk assessment (which normally take about two years) is concluded, EU legislation is stipulated to make that food or feed, containing a level of mycotoxins unacceptable from a public health viewpoint, is not placed on the market. Since mycotoxins are naturally occurring, impose a total ban will be impossible. Instead, the EU protects human and animal health by ensuring that mycotoxins are kept at levels which are as low as possible (according to the ALARA (As Low As Reasonably Achievable) principle), determined on the basis of sound scientific evidence (by EFSA), and following a range of good agricultural practices during the handling, storage, processing and distribution of cereals and oilseeds.

During the legislative proposal process, relevant experts from EU member states are consulted by the EU Commission in dedicated meetings, such as "The Standing Committee on the Food Chain and Animal Health". During this process, also relevant stakeholders are consulted - in public or targeted consultations - to check if the proposed regulatory levels are feasible in practice and to check the economic impact.

Once the new regulatory levels are in place (after having been published in EU legal acts: regulations, directives, decisions, recommendations and opinions), all actors in the value chain have to comply, and from the date of enforcement, food and feed exceeding maximum levels cannot be placed in the market anymore (although normally a 6 months transition period is granted).

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Sometimes, indicative levels are instead established (with a Commission monitoring Recommendation) for a certain mycotoxin in food. These levels should not affect the possibility to place on the market any food, but investigations should be carried out by relevant EU member States authorities, and/or Food Business Operators, when the concentration of a certain mycotoxin in food exceeds those indicative levels.

Regarding feed, guidance values can also instead be established for certain mycotoxins, in case there is no (or an imperceptible) transfer of such mycotoxins into food of animal origin, hence not leading to any significant harm for consumers.

Member State authorities are responsible for sampling food products, to ensure that they comply with the EU legislation. For imported foodstuffs, the country of origin is responsible for compliance with EU legislation, and this is controlled at EU borders.

Member States must report to EFSA the occurrence data that they have collected on mycotoxins. Stakeholders can also submit occurrence data to EFSA each year, within the Annual call for continuous collection of chemical contaminants occurrence data in food and feed, provided such data should be supplied in line with EFSA's reporting requirements.

COCERAL has first carried out a survey among its members regarding mycotoxin management in 2007. The survey was repeated in 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023 and latest in 2025. Over the time, some questions have been adapted or added to the survey but with the continuing objective to gain an overview on of mycotoxins management practices carried out by COCERAL members.

COCERAL members are on the one hand grain collectors and international traders of cereals, oilseeds, pulses, olive oil, oils and fats, animal feed, but also agrosupply distributors, who often advise farmers all along the production cycle on the choice of seed varieties and the of use of fertilisers and plant protection products.

The first part of the survey focuses specifically on agrosupply distributors' contribution to prevention of mycotoxins risk in the field. Almost all agrosupply distributors participating in the 2025 survey that advise farmers inform them about practices aimed at minimising mycotoxin development in the field, for example by recommending *Fusarium* spp resistant seeds or adapted fungicides treatments or generally by advising farmers on good agricultural practices (tillage, crop rotations, etc). Further to the advice provided, mycotoxin risk management of farmers improves.

The second section of the survey aims at sampling and testing practices pursued by grain collectors and international traders. They intervene mostly after the grain is harvested. Collectors mainly test at harvest, in store but also at loading before transport (testing before harvest, or at delivery to first processing industry, is done only to a minor extent). When importing and trading within the EU and/or UK, testing tends to take place more frequently at loading before transport (e.g. loading of trucks/vessels/barges, etc.) but also (to a minor extent) in store.

With 93% of survey participants indicating that they sample their lots to monitor mycotoxins, this highlights a continuous awareness of mycotoxin issues. Survey participants were also asked which crops they sample on which mycotoxins. From the 2025 results, maize, wheat and barley appears to be the most tested crops. Some

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change in the testing patterns could be observed when comparing the replies with the 2023 survey (for more details, see the chart at page 21).

Regarding the sampling methods used by operators for mycotoxins analyses, the 2025 survey shows a predominance of the use of EU official control regulation sampling plans and internal methods and, to a minor extent, of contractual methods (such as GAFTA 124, and FOSFA sampling rules), and the CEN method EN/ISO 24333:2009. Most of our members also declared to adopt the aflatoxins protocol by EFISC-GTP and GMP+ (as they are certified according to one or both food and/or feed safety management schemes).

When carrying out mycotoxin analysis internally, operators use mostly bandage kits, o such as E.L.I.S.A. (enzyme-linked immunosorbent assay) semi-quantitative and quantitative tests. When rapid analysis is required, most collectors and traders also use external analysis. However, external analysis is also used to validate analysis carried out internally, or to complement for missing data, for example when internal testing equipment is not available. Most external laboratories used by our members are accredited according to the international standard ISO/IEC 17025:2017. Most tests carried out for our members by external laboratories is done by High-performance liquid chromatography (HPLC) and, to a minor extent, Gas chromatography (GC).

The third section of the survey aims at evaluating the impact of controls received by our members in the framework of the official control regulation, with specific regards for mycotoxins in foodstuffs[1]. Most of our members, which received an official control, declared no significant structural constraints overall, and sampling processes generally clear.
Nevertheless, some of our members expressed concerns related to the transparency, timeliness, and reliability of official control procedures. Respondents highlighted limited transparency in both processes and outcomes, reporting delays exceeding six months in some cases, and results that were at times unclear or difficult to interpret. Additional concerns included improper sample storage, false positive findings associated with deficiencies in sample preparation and handling, occasional laboratory delays linked to workload, and operational timing constraints during inspections. This eventually makes it more difficult for our members to take timely corrective measures for the respective batch.

The fourth, and last, section of the survey aims to understand the point of view of grain collectors and international traders in:

1. The measures they take to prevent and mitigate mycotoxins risks in operations, and the ones asked by their customers
2. The measures their suppliers declare to prevent and mitigate mycotoxins risks in the field

[1] Regulation (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017 on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products, amending Regulations (EC) No 999/2001, (EC) No 396/2005, (EC) No 1069/2009, (EC) No 1107/2009, (EU) No 1151/2012, (EU) No 652/2014, (EU) 2016/429 and (EU) 2016/2031 of the European Parliament and of the Council, Council Regulations (EC) No 1/2005 and (EC) No 1099/2009 and Council Directives 98/58/EC, 1999/74/EC, 2007/43/EC, 2008/119/EC and 2008/120/EC, and repealing Regulations (EC) No 854/2004 and (EC) No 882/2004 of the European Parliament and of the Council, Council Directives 89/608/EEC, 89/662/EEC, 90/425/EEC, 91/496/EEC, 96/23/EC, 96/93/EC and 97/78/EC and Council Decision 92/438/EEC (Official Controls Regulation) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02017R0625-20250105

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3. Estimating which mycotoxins might become more prevalent in the future (next 10 years) in the country/ies where grains and oilseeds are sourced, also in relationship with effect of climate change
4. The constraints experienced or expected when new regulatory levels for mycotoxins are going to be proposed/voted in the European Union.

Regarding this section, a summary of our members answers was, respectively:

1. Use of preventive measures, such as Good agricultural practices, pre-harvest testing, and supplier approval;

   Use of control measures, such as risk-based testing, appropriate drying and storage, and full traceability;

   Use of corrective measures such as segregation, restriction, and recall of non-compliant lots.

2. Implementation of good agricultural and plant protection practices, combined with sampling, testing, and monitoring at key stages, as part of an end-to-end risk management approach covering the supply chain from field to delivery.

3. Respondents identified aflatoxins, particularly Aflatoxin B1, as the most significant concern, especially in maize and under conditions of higher temperature and humidity;

   Fusarium toxins — notably Deoxynivalenol, Zearalenone, and T-2/HT-2 toxins — were also highlighted as persistent and potentially increasing risks, particularly in the context of more variable and wetter weather conditions;

   Ochratoxin A was described as a recurring issue, while Fumonisins were seen as an additional risk, especially for imports from warmer regions;

   Ergot was also reported as an emerging concern in a broader range of crops, potentially linked to drier summers, increased weed pressure, and restrictions on weed control;

   Overall, respondents expect climate change and shifting weather patterns to increase the prevalence and co-occurrence of several mycotoxin in the future.

4. Respondents expressed concern that stricter regulatory limits, including possible zero-tolerance approaches, could impose significant operational and commercial constraints on the sector;

   Lower thresholds may lead to more frequent exceedances, batch rejections, and reduced availability of compliant raw materials, particularly in difficult seasons or from certain origins. At the same time, mycotoxin occurrence remains strongly influenced by weather conditions, making risk assessment inherently complex, while the reduced availability of fungicides and herbicides is seen as increasing the likelihood of contamination and non-compliance;

   Advances in analytical methods are also contributing to more detailed and demanding compliance requirements, with respondents anticipating more

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frequent testing, broader analytical panels, higher sampling rates, increased costs, and longer turnaround times;

Additional challenges identified include greater segregation needs, more complex logistics, increased contract and claims management;

Against this background, several respondents emphasised the importance of risk-based approaches supported by harmonised EU and UK guidance, validated analytical methods, and proportionate regulatory thresholds to safeguard both food and feed safety and the continued viability of agricultural supply chains.

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EUROPEAN UNION REGULATORY FRAMEWORK

Official Control Regulation

The Regulation (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017 lays down rules for:

- the performance of official controls and other official activities by the competent authorities of the Member States;
- the financing of official controls;
- the administrative assistance and cooperation between Member States in view of the correct application of the rules;
- the performance of controls by the Commission in Member States and in third countries;
- the adoption of conditions to be fulfilled with respect to animals and goods entering the Union from a third country;
- the establishment of a computerised information system to manage information and data in relation to official controls.

Specific EU Regulation for contaminants in food

The Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food (and repealing Regulation (EC) No 1881/2006) sets maximum levels for certain contaminants in foodstuffs, amongst others for mycotoxins.

Specific EU Regulation for contaminants in feed

The Commission Directive 2002/32/EC on undesirable substance in animal feed foresees maximum levels for aflatoxin B1 and rye ergot (*Claviceps purpurea)*. Recommended guidance values for different mycotoxins are available through the Commission Recommendation 2006/576/EC from 17 August 2006 on the presence of deoxynivalenol, zearalenone, ochratoxin A, T-2 and HT-2 toxins, and fumonisins in products intended for animal feeding.

The table 1 here below summarizes the limits and guidance values for food and feed, as specified in the above-mentioned specific EU legislations.

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Table 1: Summary of CURRENT EU regulatory levels for mycotoxins in food and feed

Mycotoxins		Food	Regulatory level	Legal reference	Feed	Regulatory level	Legal reference
Storage mycotoxins	Aflatoxin B_1	Cereals *(Including processed cereal products. Products derived from cereals relate to products containing at least 80 % cereal products)*	2.0 (Maximum level in µg/kg (ppb))	2	Cereals	0.02 (Maximum content in mg/kg (ppm) relative to a feed with a moisture content of 12%)	3
		Maize and rice *(to be subjected to sorting or other physical treatment before placing on the market for the final consumer or use as an ingredient in food)*	5.0 (Maximum level in µg/kg (ppb))				
	Aflatoxin (Sum of B_1, B_2, G_1, and G_2)	Cereals *(Including processed cereal products. Products derived from cereals relate to products containing at least 80 % cereal products)*	4.0 (Maximum level in µg/kg (ppb))				
		Maize and rice *(to be subjected to sorting or other physical treatment before placing on the market for the final consumer or use as an ingredient in food)*	10.0 (Maximum level in µg/kg (ppb))				
	Ochratoxin A	Unprocessed cereal grains	5.0 (Maximum level in µg/kg (ppb))[4]		Cereals and cereal products	0.25 (Guidance value in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	5
		Products derived from unprocessed cereal grains and cereals placed on the market for the final consumer (*(Including processed cereal products. Products derived from cereals relate to products containing at least 80 % cereal products)*	3.0 (Maximum level in µg/kg (ppb))				
		Sunflower seeds, hempseeds, soybeans	5.0 (Maximum level in µg/kg (ppb))				

[2] Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food (and repealing Regulation (EC) No 1881/2006)
[3] Directive 2002/32/EC
[4] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing
[5] Commission Recommendation (EC) 2006/576

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Mycotoxins		Food	Regulatory level	Legal reference	Feed	Regulatory level	Legal reference
Field mycotoxins	Deoxynivalenol	Unprocessed cereal grains *(except rice)*	1000 (Maximum level in µg/kg (ppb))[6]	7	Cereals and cereal products	8 (Guidance value in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	8
		Unprocessed durum wheat grains	1500 (Maximum level in µg/kg (ppb)) [9]				
		Unprocessed oat grains with husk	1750 (Maximum level in µg/kg (ppb)) [10]				
		Cereals placed on the market for the final consumer *(except rice and rice products)*	750 (Maximum level in µg/kg (ppb)) [11]				
		Unprocessed maize grains *(Except unprocessed maize grains for which it is evident e.g. through labelling or destination, that they are intended for use in a wet milling process only (starch production)*	1500 (Maximum level in µg/kg (ppb)) [12]		Maize by-products	12 (Guidance value in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	
	Zearalenone	Unprocessed cereal grains *(except rice)*	100 (Maximum level in µg/kg (ppb))[13]		Cereals and cereal products	2 (Guidance value in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	
		Cereals placed on the market for the final consumer *(except rice and rice products)*	75 (Maximum level in µg/kg (ppb)				

[6] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing
[7] Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food (and repealing Regulation (EC) No 1881/2006)
[8] Commission Recommendation (EC) 2006/576
[9] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing
[10] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing
[11] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing
[12] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing
[13] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing

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Mycotoxins		Food	Regulatory level	Legal reference	Feed	Regulatory level	Legal reference
Field mycotoxins	Zearalenone	Unprocessed maize grains *(Except unprocessed maize grains for which it is evident e.g. through labelling or destination, that they are intended for use in a wet milling process only (starch production)*	350 (Maximum level in µg/kg (ppb))[14]	15	Maize by-products	3 (Guidance value in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	16
		Maize placed on the market for the final consumer	100 (Maximum level in µg/kg (ppb))				
	Fumonisins (sum of B_1 and B_2)	Unprocessed maize grains *(Except unprocessed maize grains for which it is evident e.g. through labelling or destination, that they are intended for use in a wet milling process only (starch production)*	4000 (Maximum level in µg/kg (ppb))[17]		Maize and maize products	60 (Guidance value in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	
		Maize placed on the market for the final consumer	100 (Maximum level in µg/kg (ppb))				
	Ergot sclerotia	Unprocessed cereal grains (Except maize and rice)	0.2 (Maximum level in g/kg)		Feed materials and compound feed containing unground cereals	1000 (Maximum content in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	18
		Unprocessed rye grains	0.2 (Maximum level in g/kg)				

[14] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing
[15] Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food (and repealing Regulation (EC) No 1881/2006)
[16] Commission Recommendation (EC) 2006/576
[17] The maximum level applies to unprocessed cereal grains placed on the market before first-stage processing
[18] Directive 2002/32/EC

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Mycotoxins		Food	Regulatory level	Legal reference	Feed	Regulatory level	Legal reference
Field mycotoxins	Ergot alkaloids[19]	Milling products of barley, spelt and oats (with an ash content lower than 900mg/100g dry matter)	50 (Maximum level in µg/kg (ppb))	20			
		Milling products of wheat (with an ash content lower than 900mg/100g dry matter)	100 *(50 as from 1 July 2028)* (Maximum level in µg/kg (ppb))				
		Milling products of barley, wheat, spelt and oats (with an ash content equal or higher than 900mg/100g dry matter) Barley, wheat, spelt and oats grains placed on the market for the final consumer	150 (Maximum level in µg/kg (ppb))				
		Rye milling products: Rye placed on the market for the final consumer	500 (250 as from 1 July 2028) (Maximum level in µg/kg (ppb))				
	Sum of T-2 and HT-2 Toxins	Unprocessed malting barley grains	200 (Maximum level[21] in µg/kg (ppb))		Other cereal products	500 (Indicative level in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	22
		Unprocessed barley grains other than malting barley grains	150 (Maximum level[23] in µg/kg (ppb))				
		Unprocessed oat grains with inedible husk	1250 (Maximum level[24] in µg/kg (ppb))		Oat milling products (husks)	2000 (Indicative level in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	

[19] Lower bound sum of ergocornine/ergocorninine; ergocristine/ergocristinine; ergocryptine/ergocryptinine (α- and β-form); ergometrine/ergometrinine; ergosine/ergosinine; ergotamine/ergotaminine
[20] Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food (and repealing Regulation (EC) No 1881/2006)
[21] The maximum level applies to unprocessed malting barley grains placed on the market for first-stage processing
[22] Commission Recommendation of 27 March 2013 on the presence of T-2 and HT-2 toxin in cereals and cereal products
[23] The maximum level applies to unprocessed barley grains placed on the market for first-stage processing
[24] The maximum level applies to unprocessed oat grains with husk placed on the market for first-stage processing; The maximum level applies to the oat grains with the inedible husk included

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Mycotoxins		Food	Regulatory level	Legal reference	Feed	Regulatory level	Legal reference
Field mycotoxins	Sum of T-2 and HT-2 Toxins	Unprocessed oat grains with inedible husk; Unprocessed durum wheat grains	100 (Maximum level[25] in µg/kg (ppb))	26	Other cereal products	500 (Indicative level in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	27
		Unprocessed maize grains[28]	100 (Maximum level[29] in µg/kg (ppb))				
		Unprocessed other cereals (Rye) (except rice)	50 (Maximum level[30] in µg/kg (ppb))				
		Oats placed on the market for the final consumer	100 (Maximum level in µg/kg (ppb))		Oat milling products (husks)	2000 (Indicative level in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	31
		Cereals placed on the market for the final consumer (except rice)	20 (Maximum level in µg/kg (ppb))		Oat milling products (husks)	2000 (Indicative level in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	
		Barley, maize and durum wheat placed on the market for the final consumer	50 (Maximum level in µg/kg (ppb))		Other cereal products	500 (Indicative level in mg/kg (ppm) relative to a feed with a moisture content of 12 %)	

[25] The maximum level applies to unprocessed durum wheat grains placed on the market for first-stage processing
[26] Commission Regulation (EU) 2023/915 of 25 April 2023 on maximum levels for certain contaminants in food (and repealing Regulation (EC) No 1881/2006)
[27] Commission Recommendation of 27 March 2013 on the presence of T-2 and HT-2 toxin in cereals and cereal products
[28] (Except unprocessed maize grains for which it is evident, e.g. through labelling or destination, that they are intended for use in a wet milling process only (starch production))
[29] The maximum level applies to unprocessed maize grains placed on the market for first-stage processing
[30] The maximum level applies to unprocessed cereal grains placed on the market for first-stage processing
[31] Commission Recommendation of 27 March 2013 on the presence of T-2 and HT-2 toxin in cereals and cereal products

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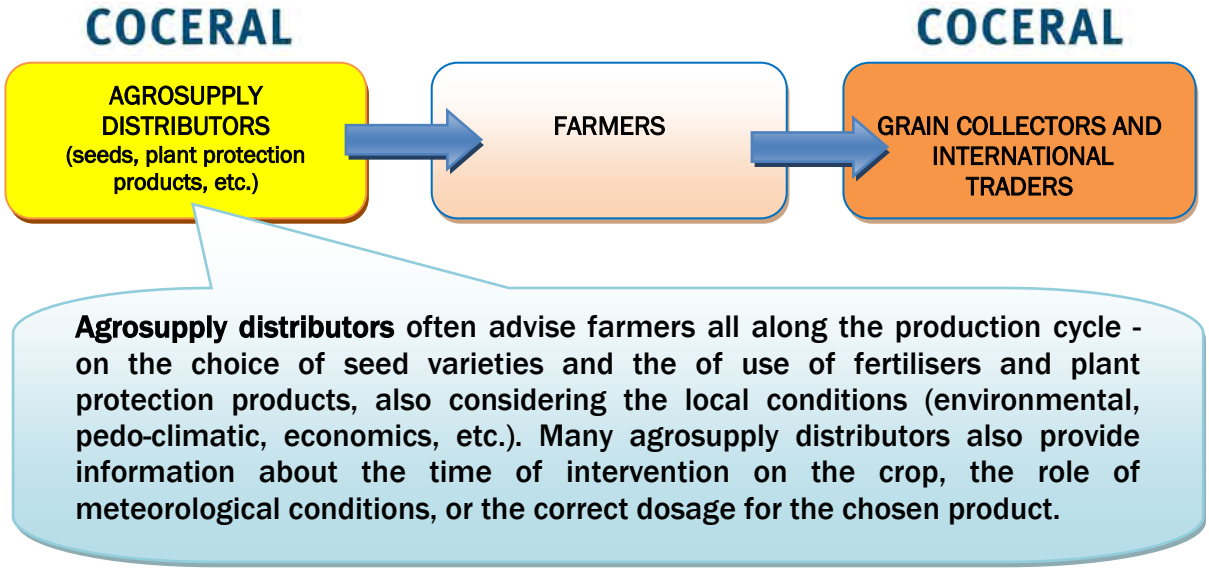
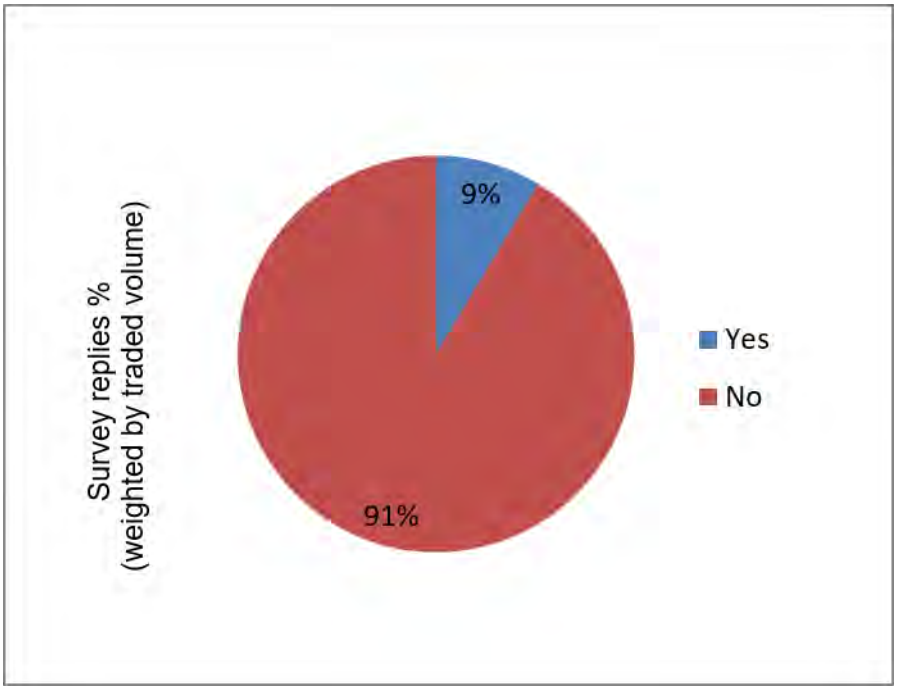
1 Minimising risks posed by mycotoxins in the field

This section refers to the agrosupply distributors, members of COCERAL.



1.1 Do you specifically advise farmers on mycotoxins management?



9% of the participants to the survey are agrosupply distributors, advising farmers on practices aimed at minimising the risk of mycotoxin development in the fields. This highlights that mycotoxin management is still a key concern for COCERAL agrosupply members, and that operators use their role to support farmers in managing mycotoxins development in field.

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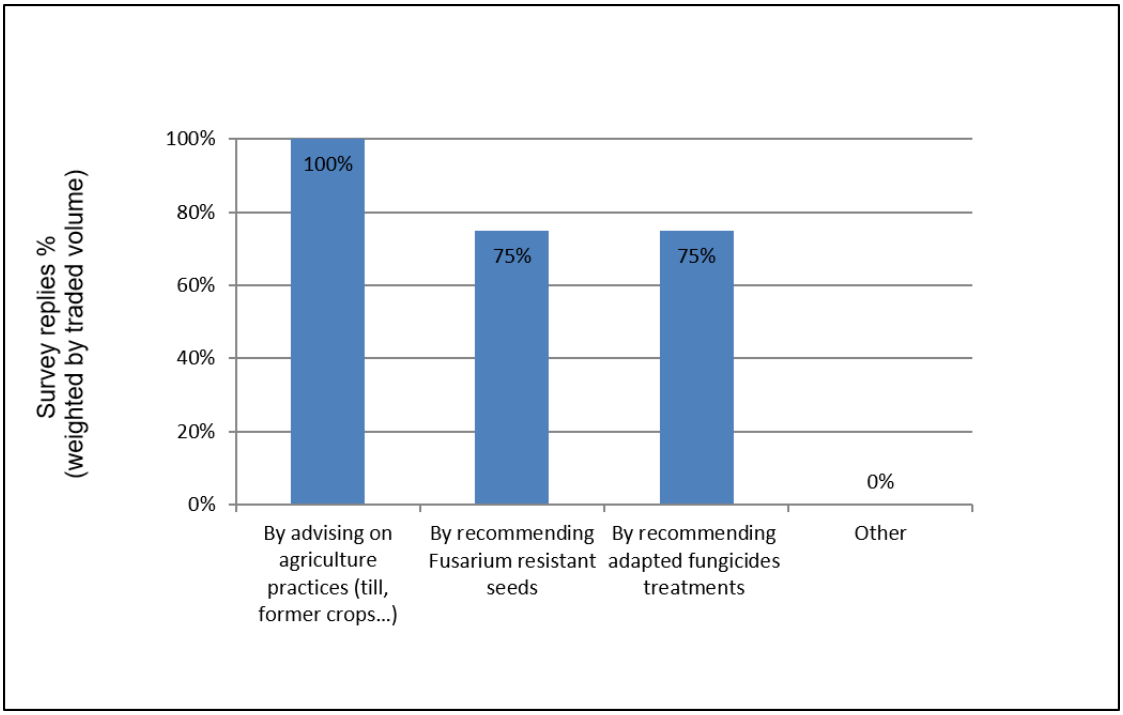
1.2 How do you manage risks of mycotoxins in the field?



When advising farmers regarding mycotoxins, agrosupply distributors recommend them to adopt good agricultural practices, use specific fungicide treatments, as well as to use *Fusarium* spp resistant seeds.

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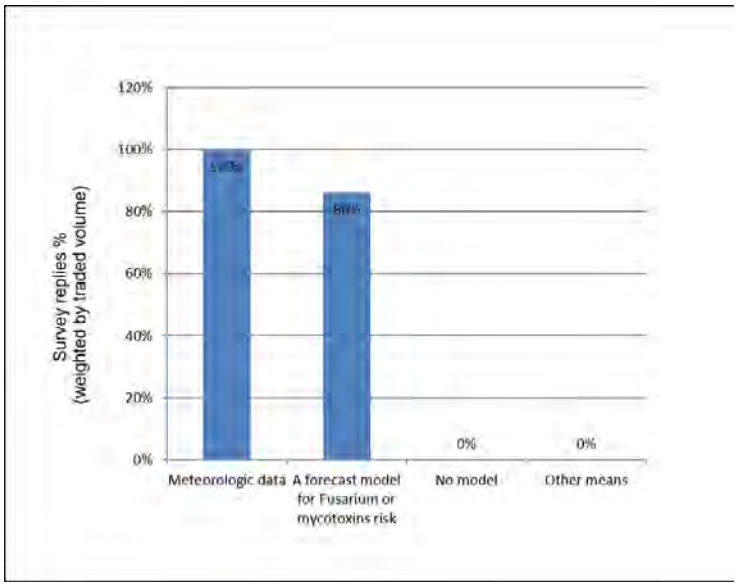
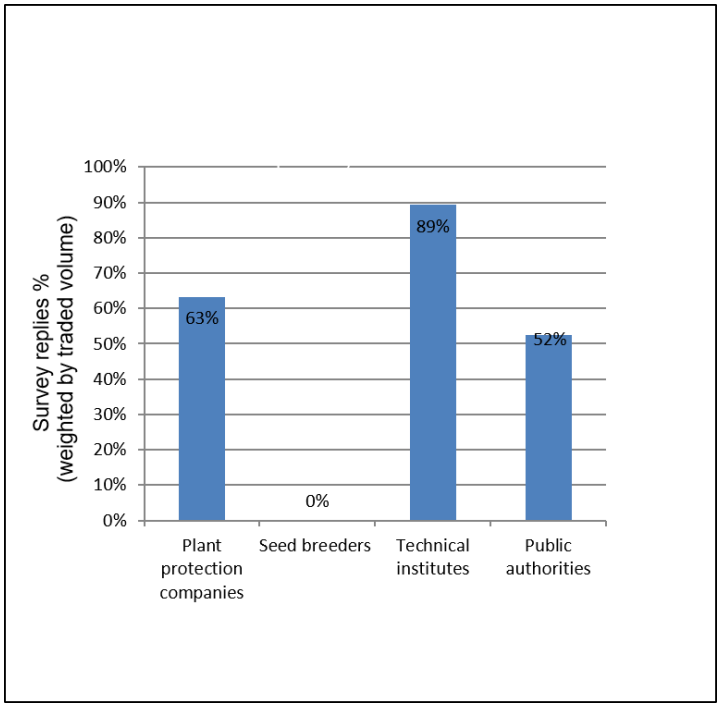
1.3 When advising farmers, what kind of approach to manage mycotoxins are you using?



The dominant models agrosupply distributors use when advising farmers seem to be meteorological data. Forecast models for *Fusarium* spp or other mycotoxin risk are still used by a large part of them. If the forecast model is used, this is still normally proposed by technical institutes or plant protection companies, and to a minor extent, by public authorities (see graph below). However, compared to the 2023 survey results, no respondents have indicated seed breeders as providers of such advices.

1.3.1 In case you apply the Forecast Model, by whom has it been proposed?



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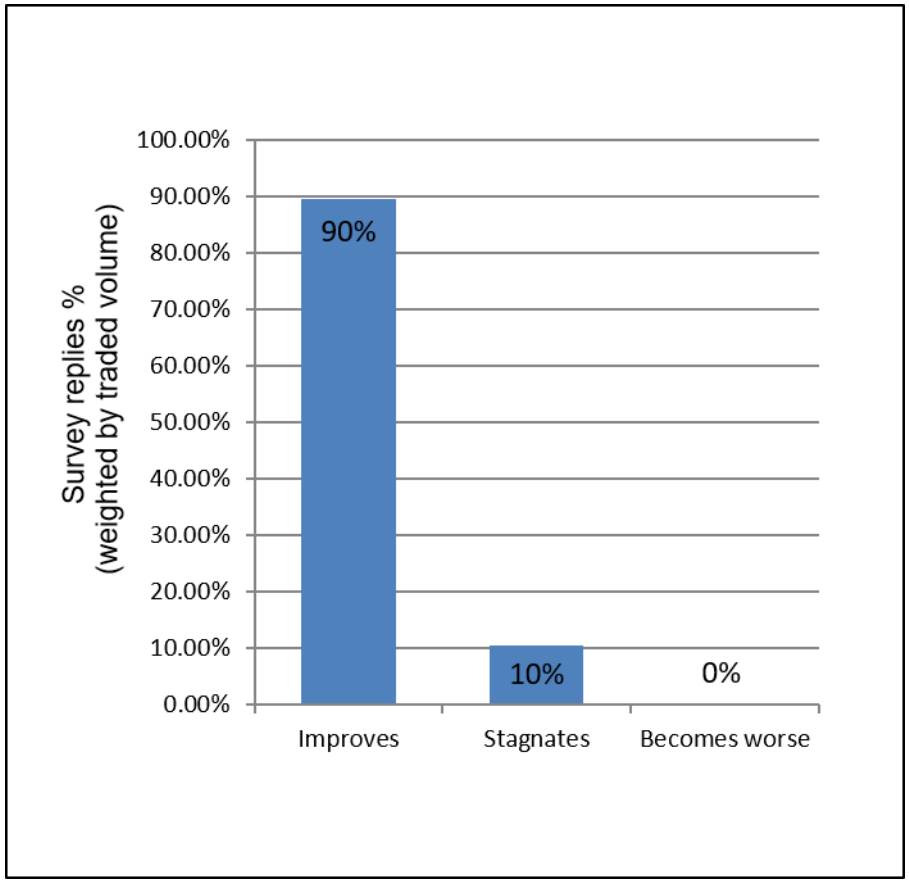
1.4 After advising farmers, the management of mycotoxins risk improves, stagnates or becomes worse?



Most of agrosupply distributors advising farmers on agricultural practices observe an improvement of the mycotoxin risk management of farmers (90%). The level confirms the same trend when compared to the 2023 survey.
By further enhancing the collaboration between the principal actors involved and gathering more knowledge concerning the mycotoxins and their prevention, agrosupply distributors continuously aim to improve the situation.

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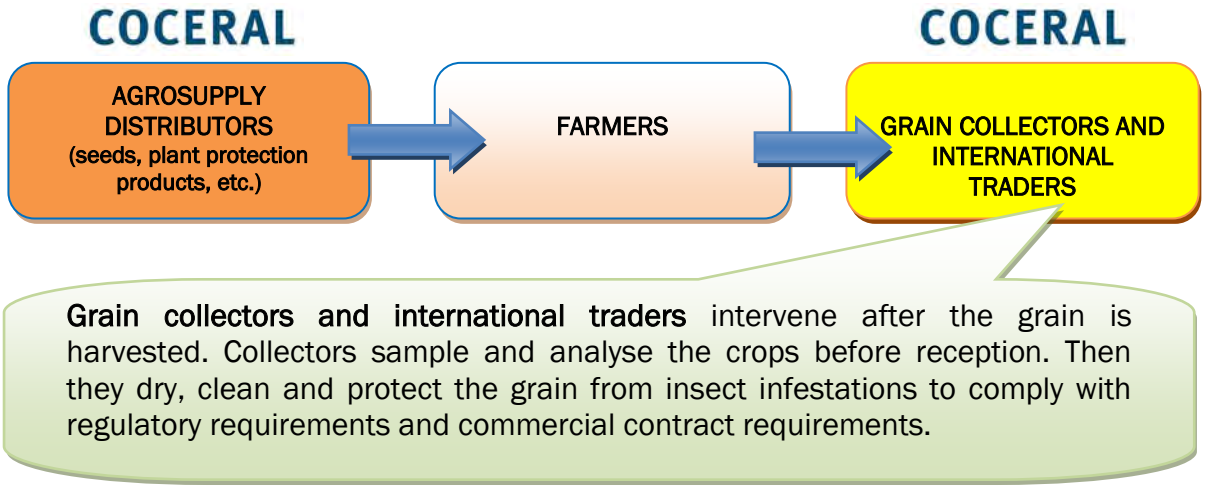
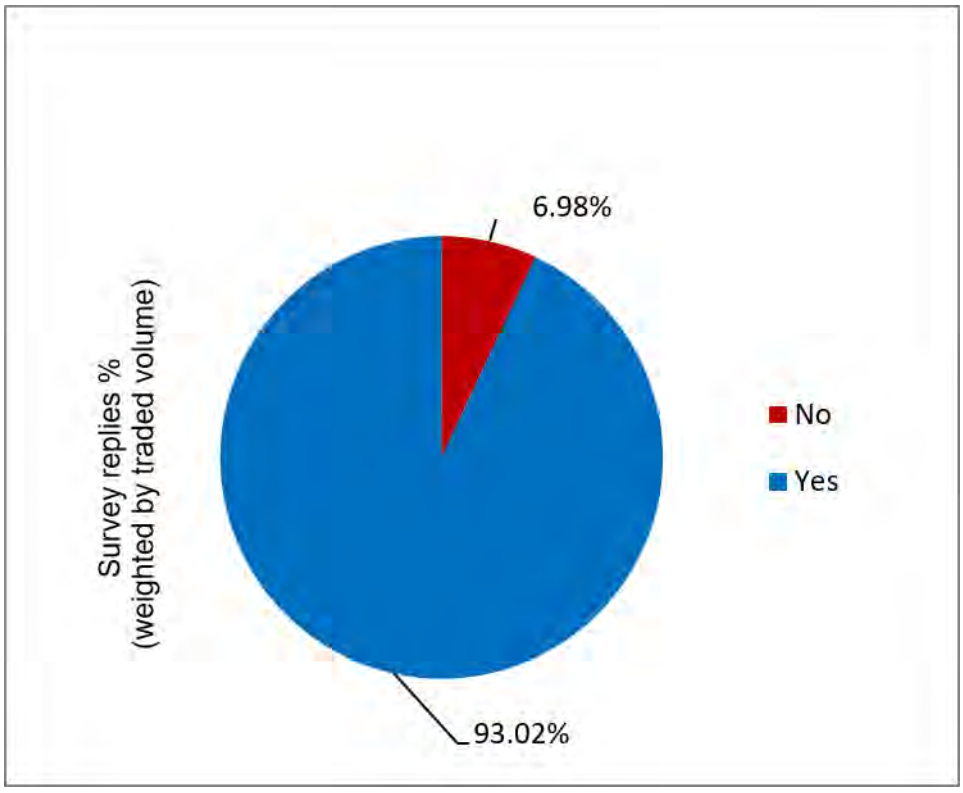
2 Sampling, analysis and detection of mycotoxins

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



2.1 Do you carry out sampling in your lots for the detection of mycotoxins?



This graph confirms the trend in growing awareness and extent of the level of monitoring that operators put in place for mycotoxin detection: 93% of the respondents to the survey indicated that they carry out mycotoxin sampling operations on their lots.

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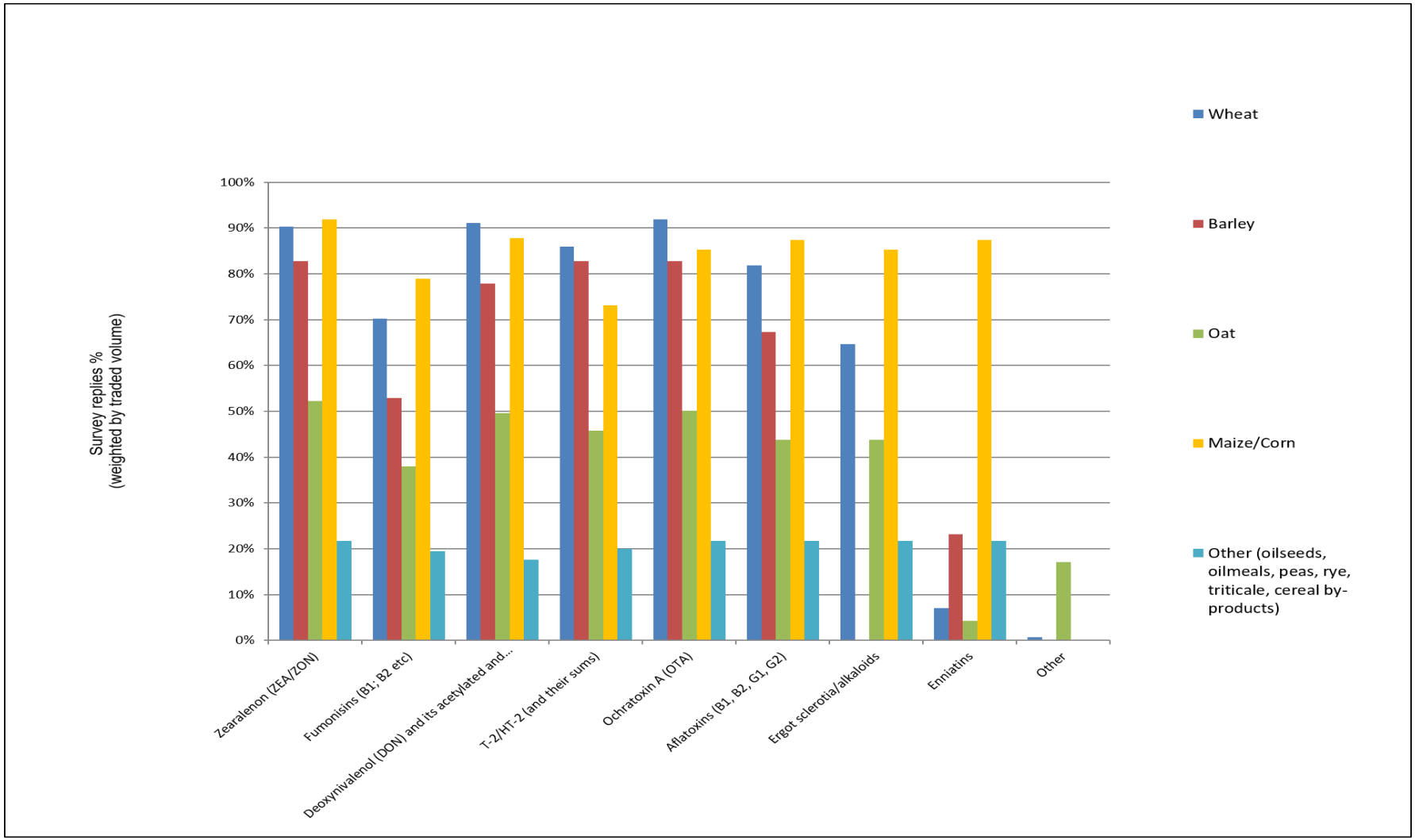
2.1.1 If YES, which mycotoxin/s are you analysing and in which crop/s?



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The chart at page 21 indicates the level of testing of different crops regarding the different mycotoxins.

Wheat, maize, and **barley** appear to be the most tested crops, with Deoxynivalenol, sum of T-2 and HT-2 toxins, Zearalenone, Ochratoxin A and Aflatoxins being the mycotoxins tested by the largest number of operators. More than 80% of the participating operators tested **maize** also on ergot sclerotia and/or alkaloids and Enniatins, while more than 60% of the participating operators tested also wheat for ergot sclerotia and/or alkaloids.

The survey findings suggest that other crops (Oat, oilseeds, oil meals, peas, rye, triticale, cereal by-products) are less frequently tested on mycotoxins than wheat, maize, barley, and oat.

In comparison to survey replies in 2023, some changes in testing patterns can be observed:

- On **Zearalenone**, a general increase of the level of testing done on all major grain crops, in comparison to the 2023 report.
- **Fumonisins** were also tested more often on wheat, barley and oats, with test on maize remaining at the same level of 2023.
- Testing for **Deoxynivalenol** remains the same for all major cereals as in the 2023 survey, while it doubled for oat,
- **Ochratoxin A** testing has increased for all major cereals on all crops since 2023, with test on maize remaining at the same level of 2023.
- Regarding **aflatoxins**, the 2025 survey results show a twofold increase of tests performed on wheat, barley and oats, with test on maize remaining at the same level of 2023.
- Testing on **Enniatins** has remained the same on maize (as in 2023) but a 50% decrease of testing for barley can be observed.
- Regarding **other crops and products (oilseeds, oil meals, peas, rye, triticale, cereal by-products),** participants to the survey indicated they tested such crops and products for the most relevant mycotoxins (i.e., Zearalenone on oilseeds and Ergot sclerotia and alkaloids on cereal and cereal products). Few respondents indicated they tested sunflower seeds for Alternaria toxins.

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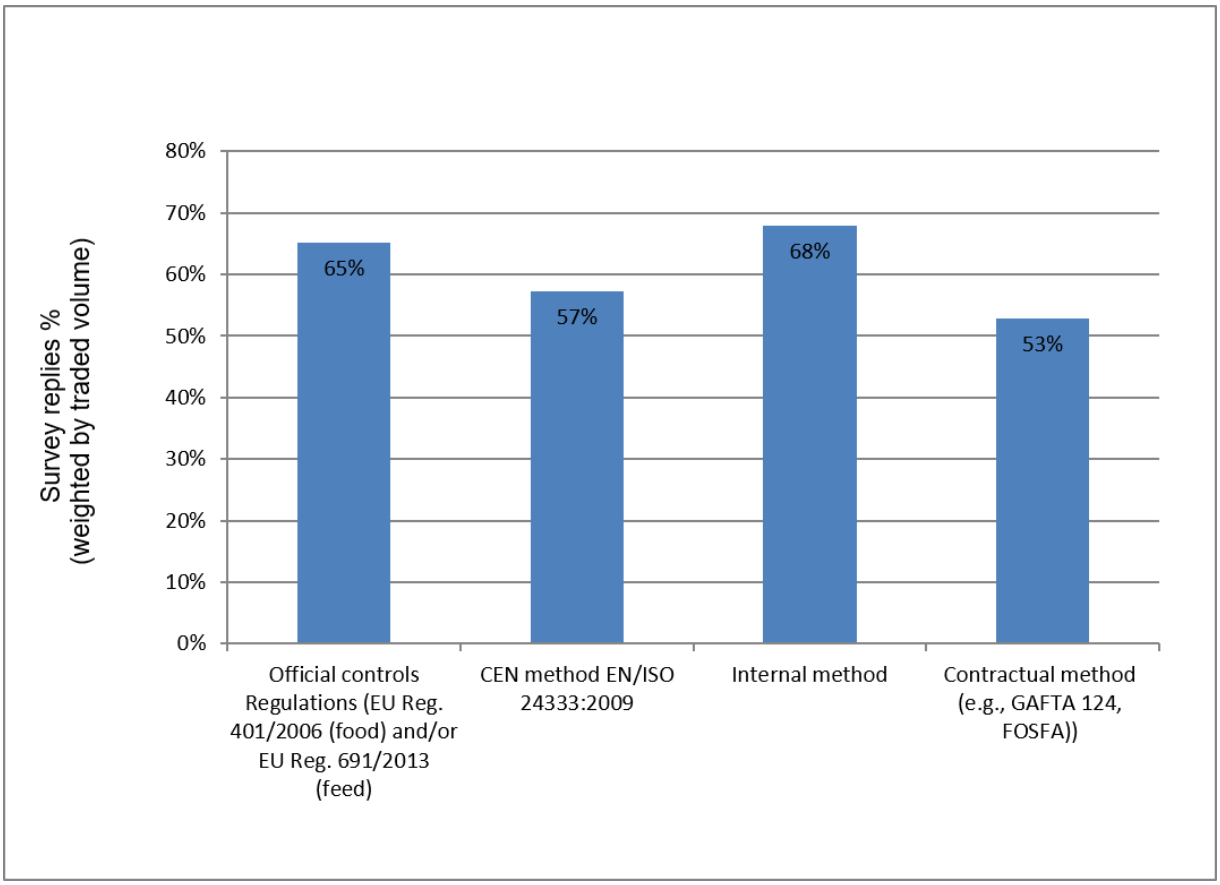
2.2 Which sampling method/s is/are used by your company for mycotoxins analyses?



Regarding the sampling methods used by operators for mycotoxins analyses, in 2025 we can see some changes in comparison with the 2023 survey:
- a 90% increase in the use of the CEN method EN/ISO 24333:2009
- a drastic increase in use of internal methods (from 3% to 68%)
- a 50 % decrease in use of contractual methods (such as GAFTA 124, and FOSFA sampling rules).

Most of our members also declared to adopt the aflatoxins protocol by EFISC-GTP and/or GMP+ (as they are certified according to one or both food and/or feed safety management schemes).

When asked about the constraints experienced in sample taking, our members provided the following answers:

- Strong heterogeneity and inhomogeneity of cargo and mycotoxin distribution
- High variability of results (especially for ergot contamination)
- Difficulty obtaining representative incremental samples under real conditions
- Large sample size required (e.g. for Aflatoxin testing)
- Logistical and safety limitations affecting sampling operations at grain terminals (limited time during loading/unloading operations; access restrictions (e.g. sealed trucks, vessels)).

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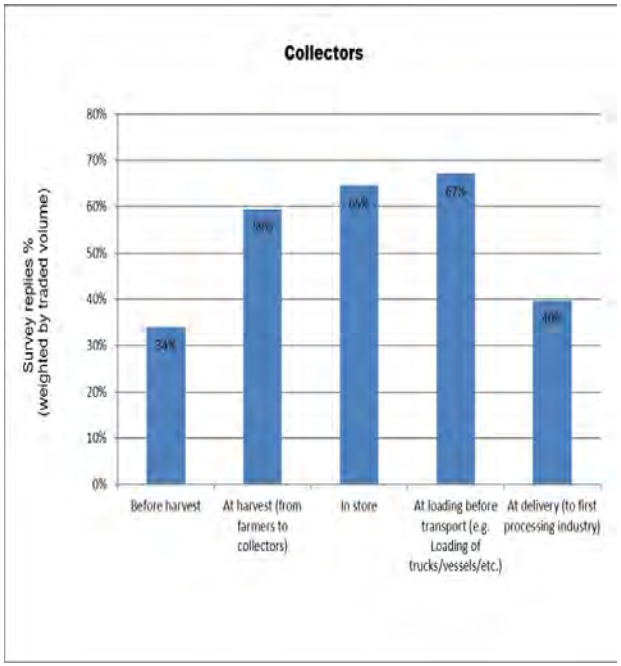
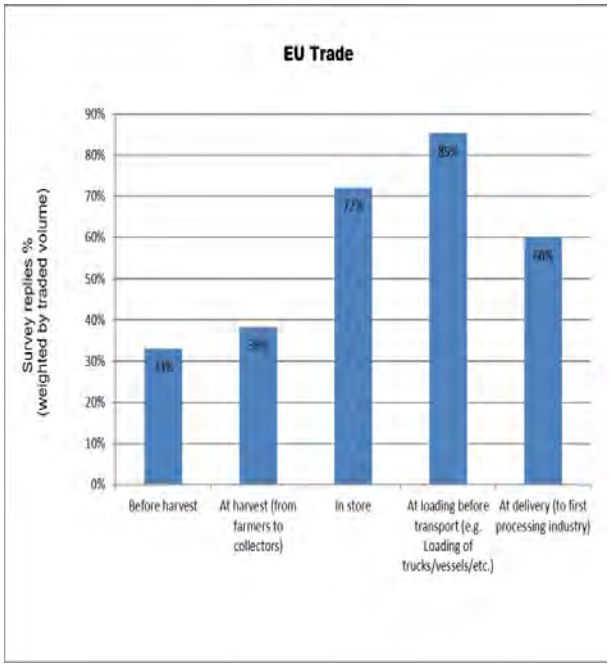
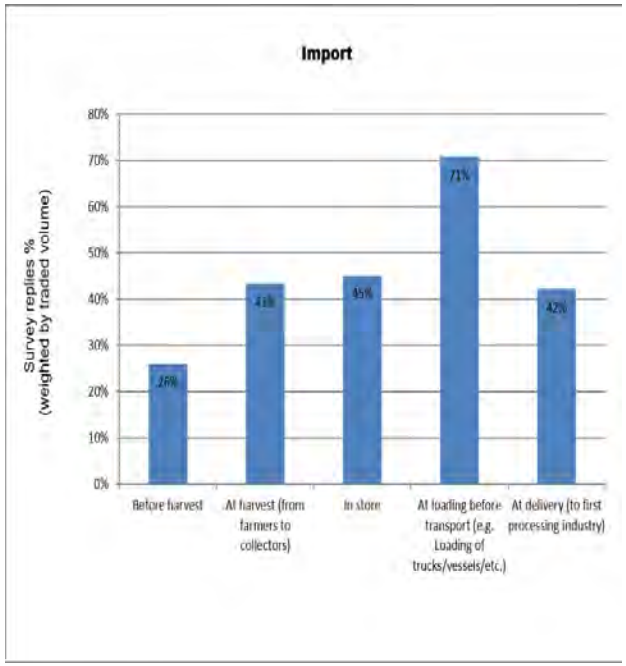
2.3 According to your activities, when do you test your lots for mycotoxins?







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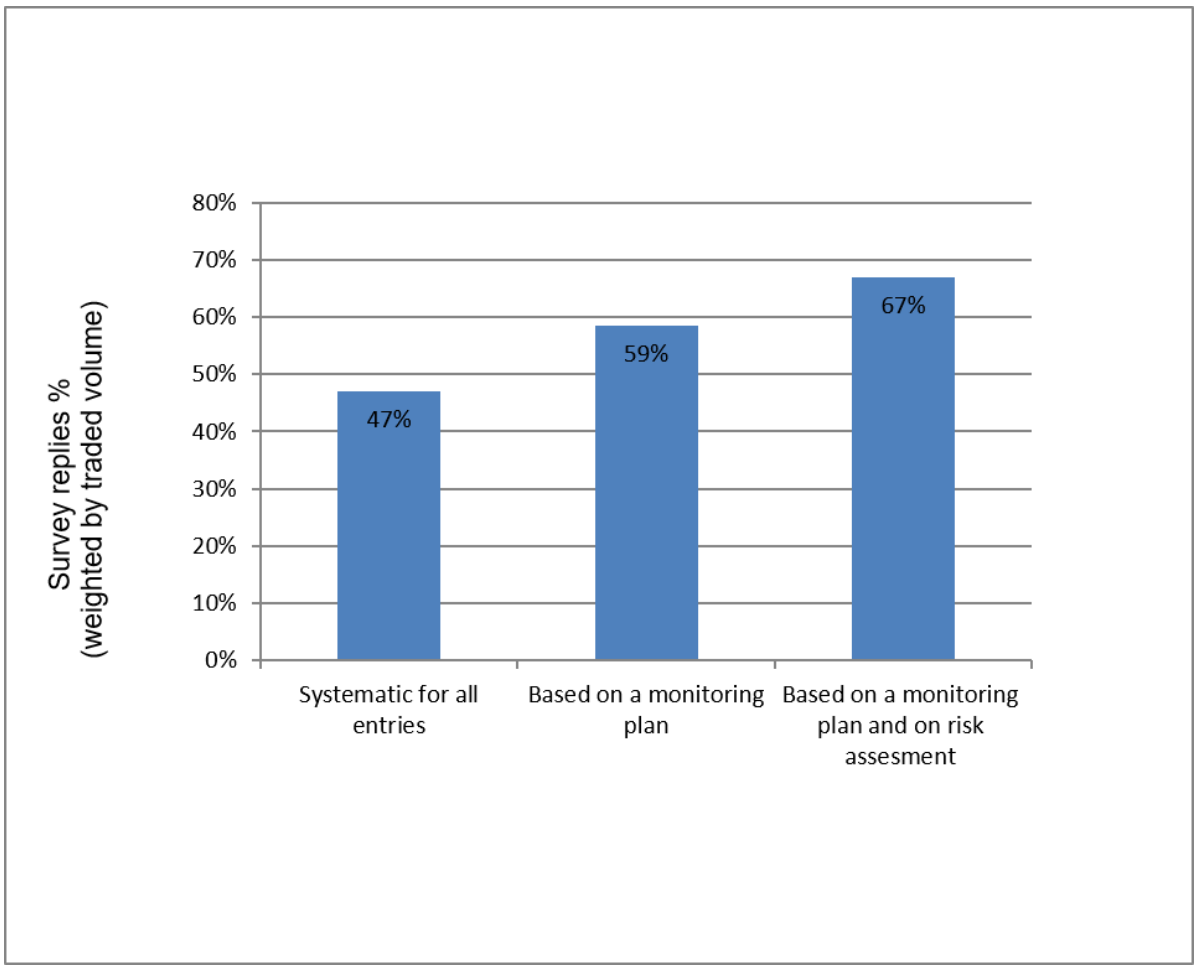
2.4 Which frequency of testing are you applying? (multiple answers possible)



Those operators that perform mycotoxin testing normally follow a monitoring plan with a risk assessment (67%), and, to a minor extent, follow a simple monitoring plan, or perform systematic testing for all entries.

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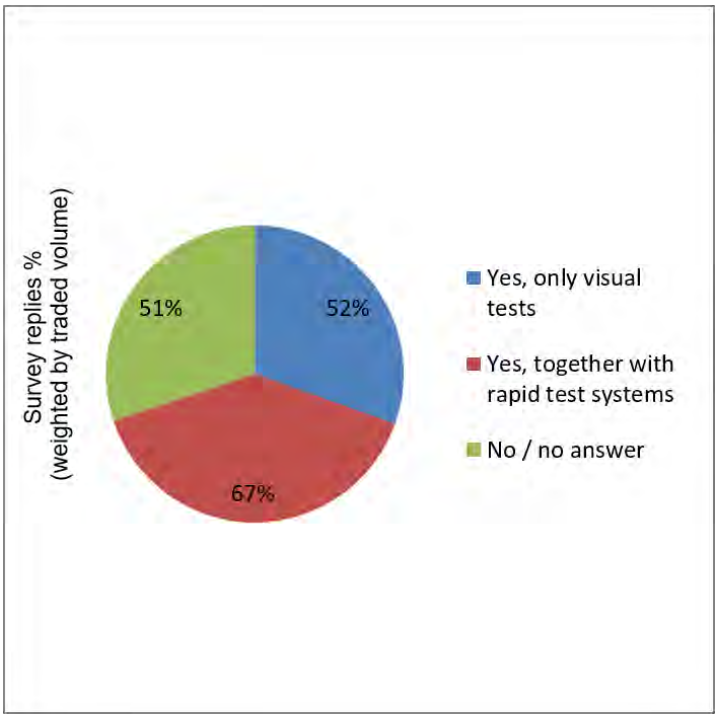
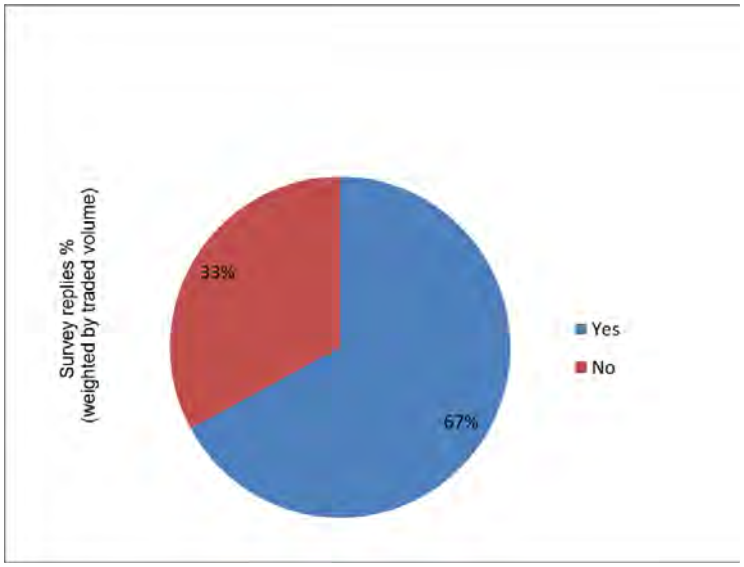
2.5 Do you carry out visual tests?



About 70% of operators carry out visual tests as a support to rapid test systems. Such practice seems more common than in the 2023 survey, where about 50% indicated that they had done so. More members declared to have only used visual tests (52% in 2025 instead of 37% back in 2023).

2.6 Do you carry out your own mycotoxins analysis at your company?



In company own analysis are required when a lot is received at a silo or warehouse and therefore rapid tests to support on-site decisions of lot acceptance are frequently used. The level of internal testing of mycotoxins keeps the same trend as in the 2023 survey.

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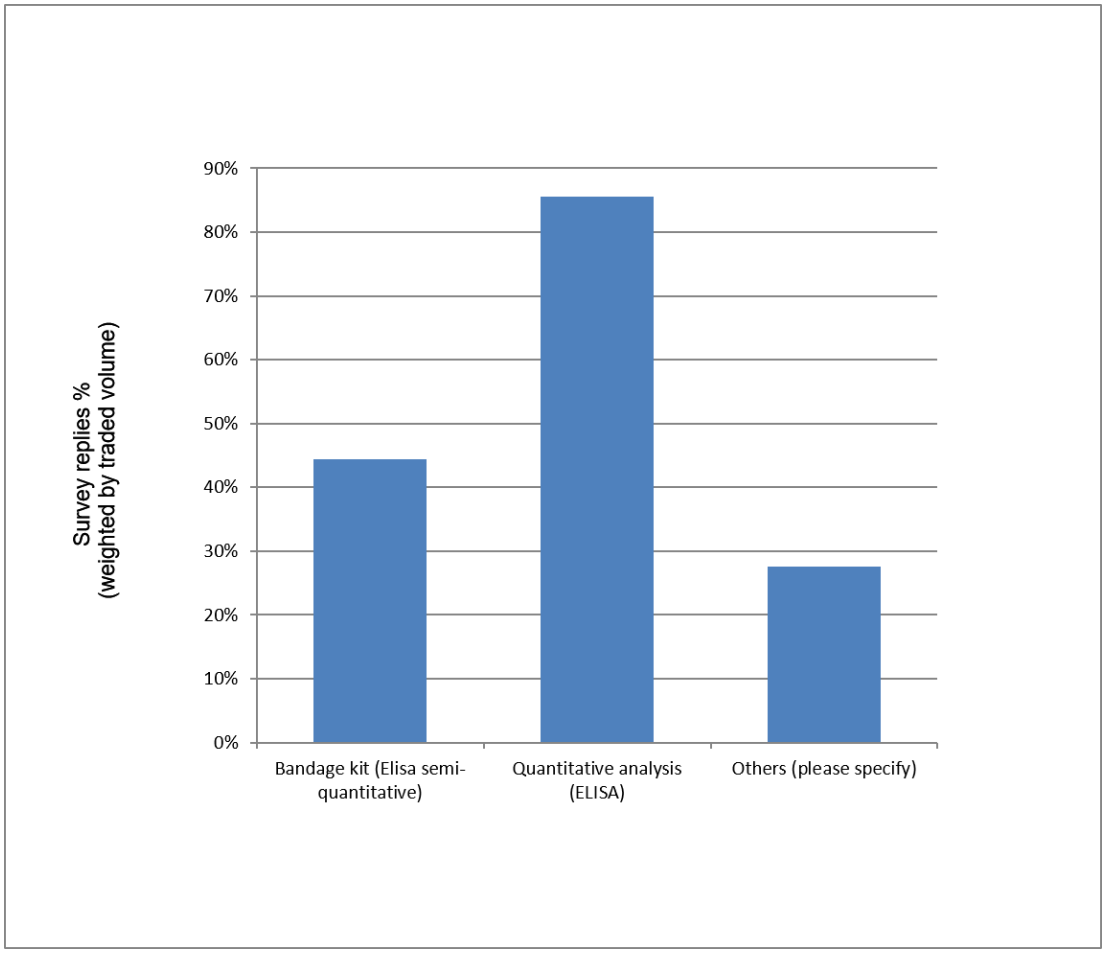
2.7.1 If you carry out mycotoxin analysis at your company, which kind of method of rapid test do you use?



The graph above indicates a balanced use of quantitative analysis, bandage kits and other systems (e.g. lateral flow test kits or in house ELISA methods). This trend was also confirmed in the 2023 report, although the use of quantitative analysis s has increased exponentially (this was zero in the report 2023), while the usage of bandage kits has reduced from 65 to 45%.
Operators declared that the main supplier of bandage kits is still Neogen and, to minor extent, Romer Lab, and Prognosis, while the main supplier of ELISA quantitative analysis is now Neogen (in the 2023 report, R-Biopharm was listed as the main supplier).

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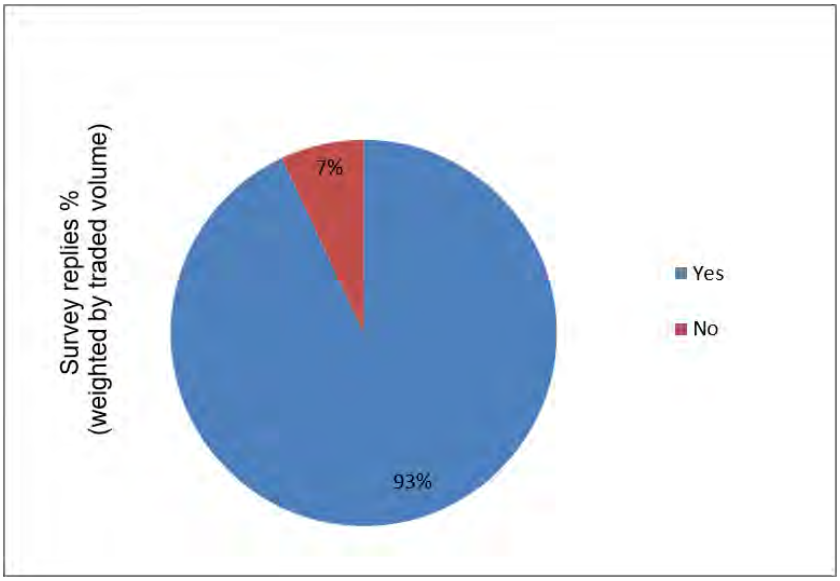
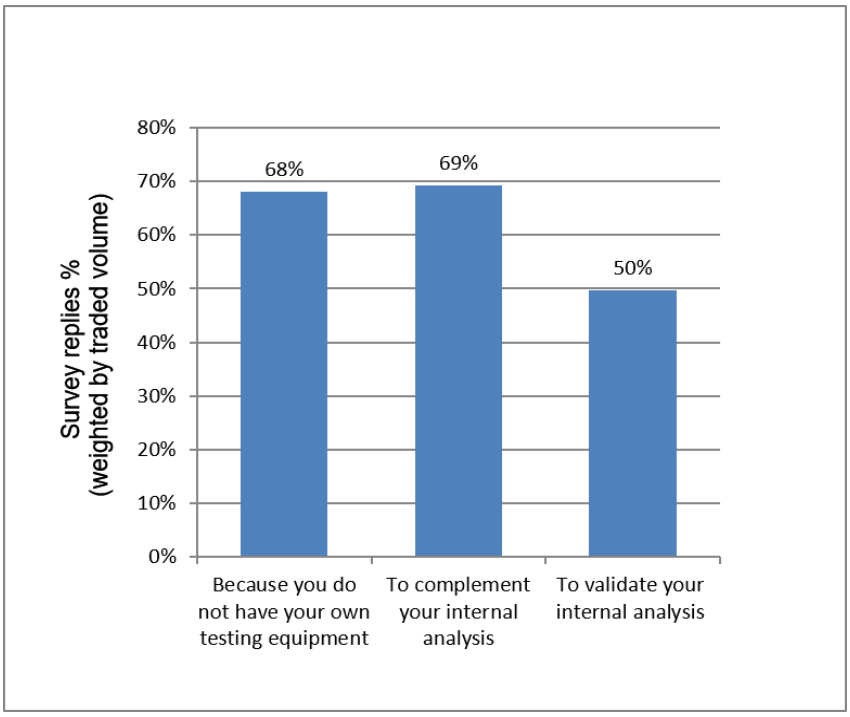
2.7 Do you carry out analysis to evaluate the presence of mycotoxins by external laboratories?



Analysis performed by external laboratories are also used to confirm the results of internal testing and/or to provide for missing data.

2.7.1 If you carry out external analysis for the mycotoxin monitoring, what is the purpose?



The reasons mentioned most often for asking external laboratories to do analysis are to complement and/or validate for internal analysis, with a small decrease since last report for the latter (from 75 to 50%). Respondents also declared that this is due to the lack of internal testing equipment (this has increased from 15 to 68% since last report).

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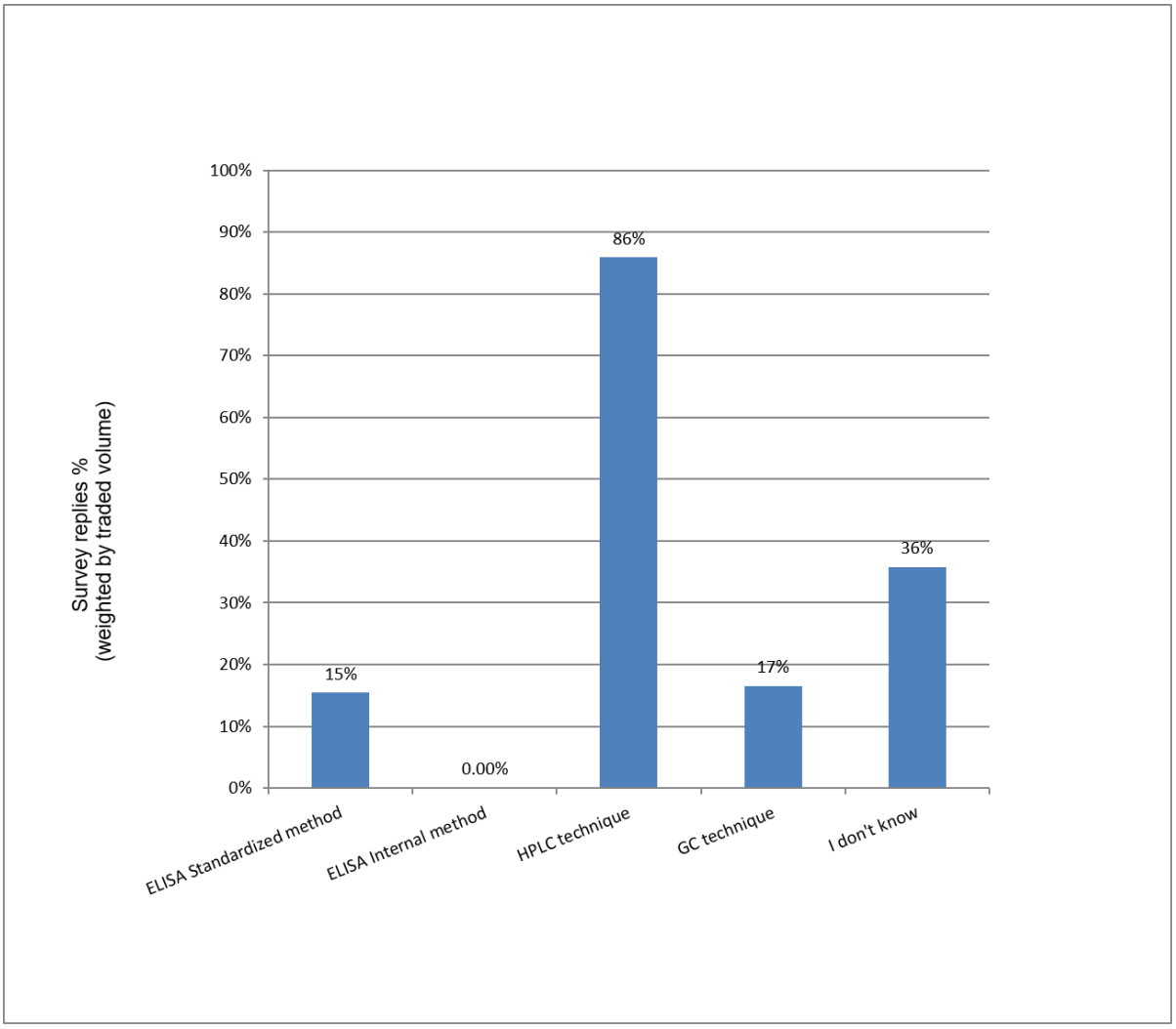
2.7.2. If you carry out external analysis for the mycotoxin monitoring, what is the methodology used by the laboratory?



Compared to the 2023 survey, the use of ELISA (standardized) testing methods in external laboratories has decreased considerably (from 61 to 15%). This can also be caused by a change in type of respondents to the survey (for example, less responses from companies with own labs).
HPLC testing seems to remain the most used technique for external analysis since 2007; participants declared that external laboratories are using more GC testing technique (from 0% in 2023 to 17% in 2025).

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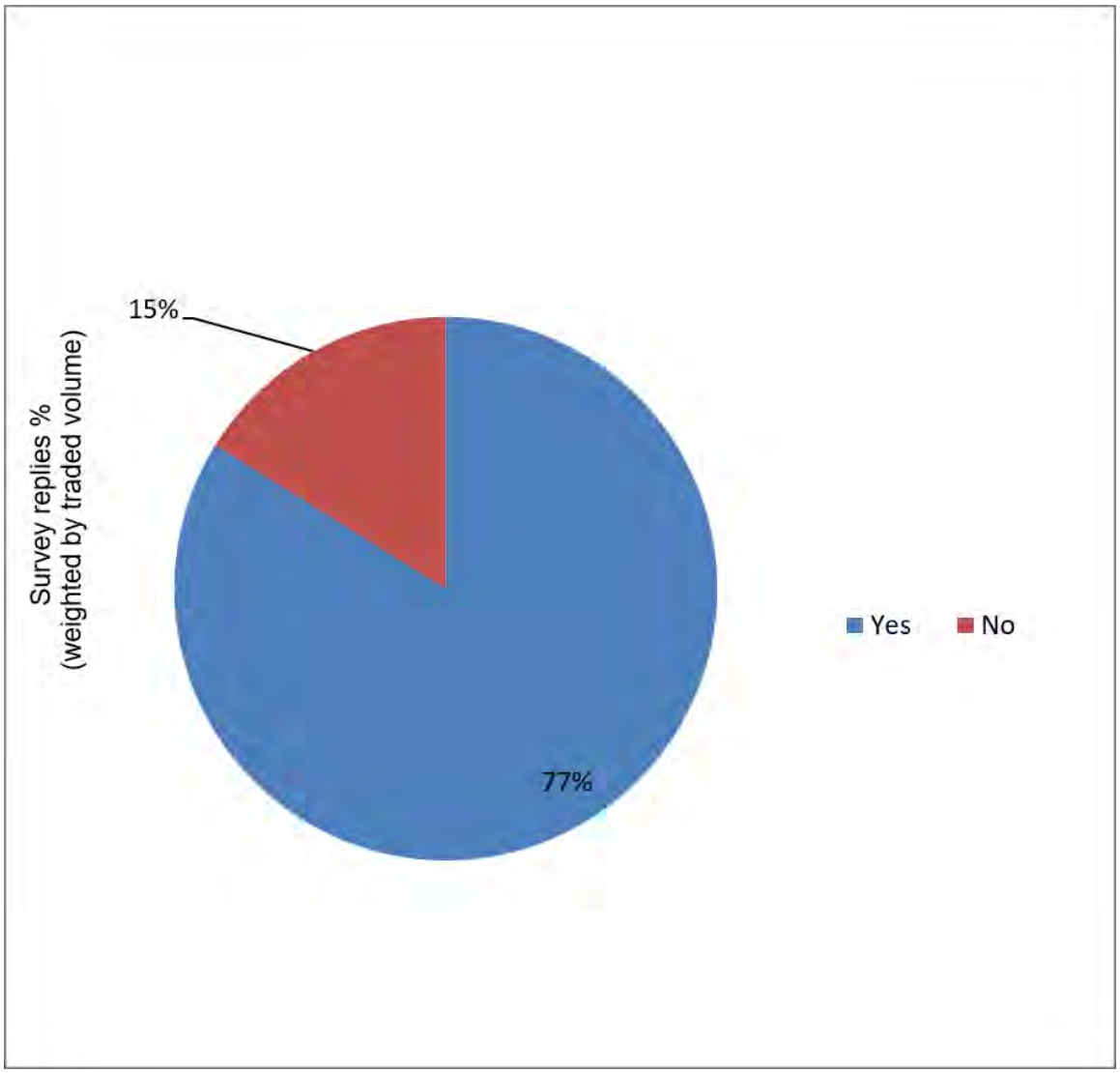
2.8 Is your testing laboratory accredited in accordance with the international standard ISO/IEC 17025?



Since 2007, the number of laboratories used that are accredited with EN17025 seems to have significantly increased. This is a positive development as accredited laboratories must publish the level of uncertainty linked to the analysis they perform which enhances the level of transparency and the comparability of analysis results. The level is not significant different from what declared by participants in 2023 (this is also because most quality assurance schemes require the use of an accredited laboratory).

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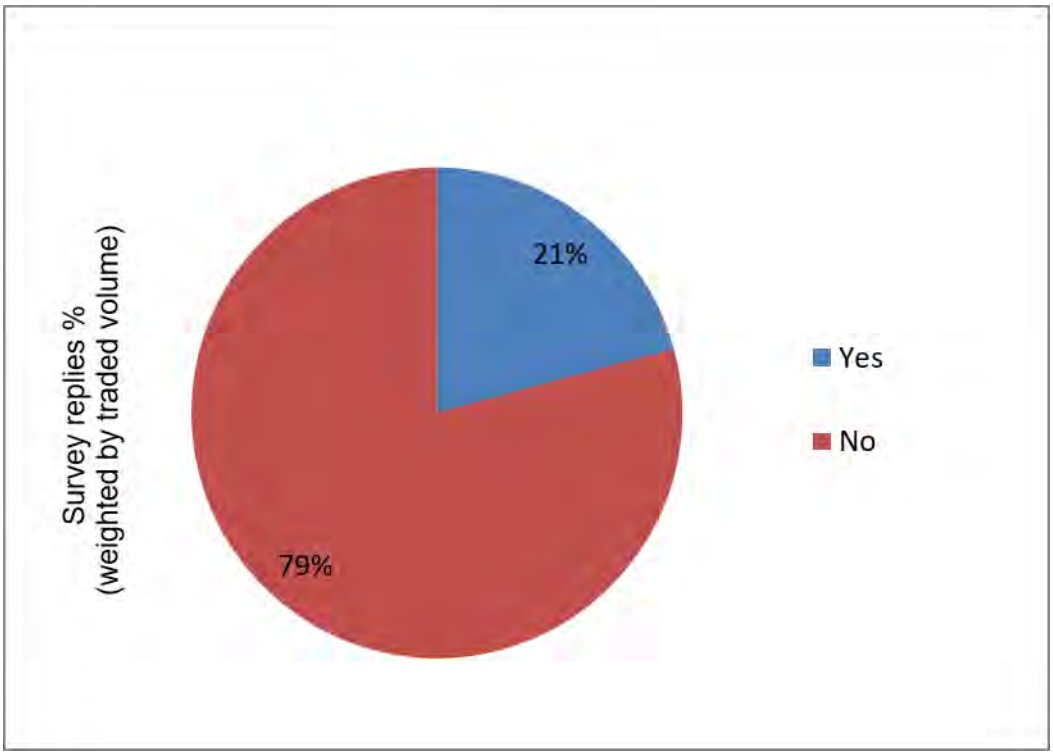
3 Regulation enforcement and controls

3.1 Have you been already controlled in the framework of the official regulation for mycotoxins in foodstuffs?



According to the survey replies, 21% of operators have been controlled within the framework of the Official Controls Regulation. This percentage was slightly higher in the 2023 report (28%).
The relevant controls authorities in the EU member States were Food (and feed) Safety agencies and/or Ministries of agriculture.
Most of our members, which received an official control in the framework of the Official Control Regulation, declared no significant structural constraints overall, and sampling processes generally clear.
In few cases, some concerns were raised regarding:

- Lack of transparency in processes and results
- Very long reporting delays (often more than 6 months)
- Results sometimes unclear or difficult to interpret
- Incorrect storage of samples
- False positive test results linked to sample preparation and handling problems
- Occasional delays in laboratory turnaround times (due to workload)
- Timing constraints during inspections.

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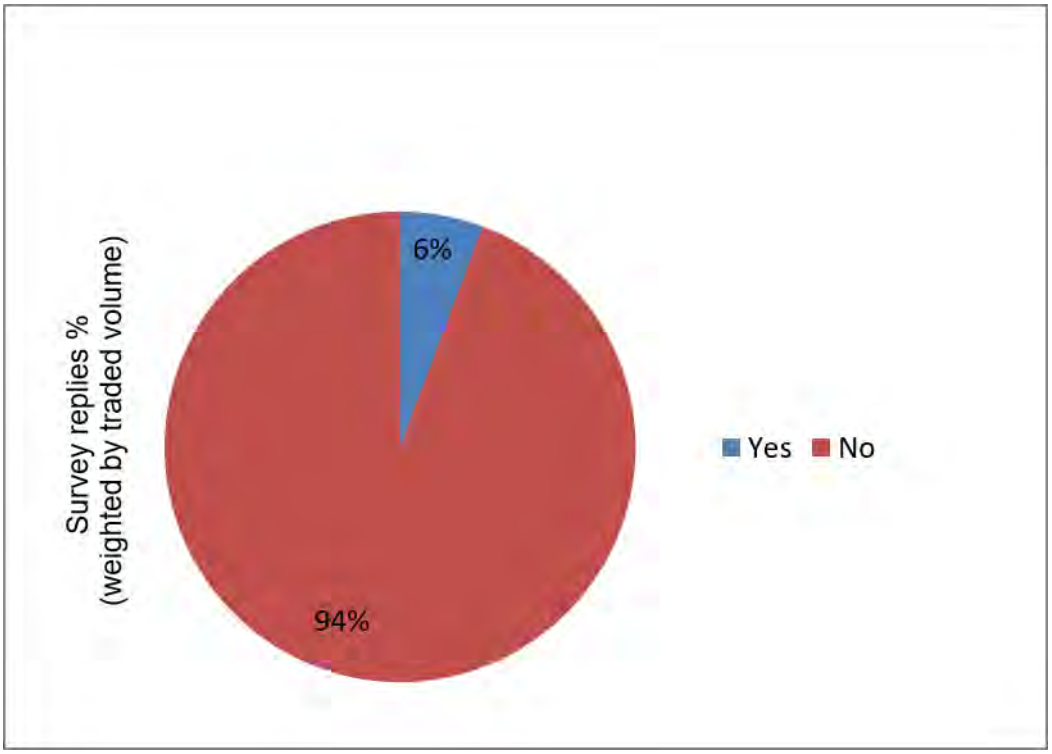
3.2 Apart from exceeding regulatory limits, did you have to conduct a product recall?



Only 6% of the participants had to recall a product lot and this was due only to commercial complaints.

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4 General open questions

This section has been introduced first in the previous edition (2023) of the COCERAL mycotoxins management survey, with a series of qualitative open questions, meant to assess how our members perceive the risk of mycotoxins, how they prevent it, and how they think that the effect of climate might impact mycotoxins occurrence in the next 10 years. Moreover, they have been asked about the constraints that current or new EU regulatory levels for such mycotoxins will pose to them, considering a possible increase in occurrence and co-occurrence of different mycotoxins in cereals and oilseeds.

4.1 Please list which measures you take to prevent and mitigate mycotoxins risks in your business, including the one asked by your customers

Pre-Harvest Practices

- Use of healthy/resistant varieties, and specific (and allowed in the EU and/or the UK) fungicides
- Pre-harvest testing
- Farmer training and awareness

Supplier & Sourcing Controls

- Supplier approval and monitoring
- Certificates of Analysis (CoA)
- Testing at loading (e.g. Aflatoxin B1)

Intake Controls

- Control of moisture and impurities
- Risk based sampling and testing of incoming lots for mycotoxins (with focus on aflatoxins)

Storage Management

- Immediate drying after harvest
- Cooling and aeration
- Regular inspections during storage
- Segregation of risky or non-compliant lots

Testing & Monitoring

- Risk-based monitoring and testing programmes
- Use of accredited laboratories and methods
- Additional testing at dispatch
- Use of independent surveyors

Transport & Logistics

- Cleaning of transport units (trucks, vessels, etc.)
- Approved transport and storage conditions
- Controls during loading and shipping

Quality & Safety Systems

- EFISC-GTP and/or GMP+ food and feed safety schemes

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- Risk assessments

Traceability & Documentation, and corrective actions

- Full traceability systems
- Contractual quality specifications
- Segregation of non-compliant lots
- Recall procedures, when regulatory limits are approached/exceeded

Training & Awareness

- Staff training
- Ongoing vigilance and risk detection

4.2 Please list which measures your suppliers declare to prevent and mitigate mycotoxins risks in the field

- Implementation of good agricultural practices, including crop rotation, soil management, and the use of resistant varieties
- Application of plant protection and pest management measures, including approved fungicides
- Sampling, testing, and monitoring at pre-harvest, harvest and delivery
- Adoption of an end-to-end risk management approach covering the chain from field to delivery

4.3 Please estimate which mycotoxins might become more prevalent in the future (next 10 years) in the country/ies you source your grains and oilseeds, also in relationship with effect of climate change

Overall, respondents expect climate change and changing weather patterns to increase the relevance of several mycotoxins in the future, such as:

- Aflatoxins (especially Aflatoxin B1) were most frequently identified as a key concern, particularly in maize and in relation to higher temperatures and humidity
- Fusarium toxins remain a major issue, notably DON, ZEA, and T-2/HT-2 toxins, with expectations of increased prevalence under more variable and wetter weather conditions
- Ochratoxin A (OTA) was also highlighted as a recurring concern, with moderate increases expected in some cases
- Fumonisins were identified as an additional risk, especially for imports from warmer regions and depending on origin and climatic conditions
- Ergot was noted as an increasing concern in a wider range of crops, not only rye, potentially linked to drier summers, greater weed pressure, and restrictions on weed control

4.4 Which constraints have you experienced, or do you expect when new regulatory levels for mycotoxins are going to be proposed/voted in the EU?

- Stricter regulatory limits, including possible zero-tolerance approaches, are expected to create significant constraints for the grain supply chain

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- Lower thresholds may lead to more frequent exceedances and possible rejection of batches
- Mycotoxin occurrence is influenced by weather conditions and agricultural practices. Climate change results in more extreme weather conditions, which in turn results in more volatile mycotoxin occurrence. This influences the accuracy of risk assessments and mitigation measures. This, in combination with lower thresholds, increases the risk of non-compliant batches.
- The reduction in available fungicides and herbicides is seen as increasing the likelihood of contamination and non-compliance
- Improved analytical methods are leading to more detailed and demanding regulatory requirements
- Companies expect more frequent testing, with higher sampling rates per batch, truck, or vessel (This will result in higher analytical costs and longer turnaround times for results)
- Additional impacts include greater segregation needs, more complex logistics, and increased contract and claims management
- There are concerns about the reduced availability of compliant raw materials, particularly in difficult seasons or from certain origins
- Some respondents highlighted divergence with requirements from the United Kingdom as an added complication
- Some other respondents ask for risk-based approaches supported by harmonised EU guidance, validated analytical methods and proportionate regulatory thresholds, essential to ensure both food and feed safety and the continued viability of agricultural supply chains.

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ANNEX 1: QUESTIONNAIRE "MYCOTOXIN MANAGEMENT" 2025

YOUR COMPANY IS (more than one answer is possible):

☐ Providing advice and selling seeds and/or Plant Protection Products (PPPs) (Agro-supply advisor on the use of PPPs)

➥ Please state approx. how many farmers:

☐ Collecting grains from farmers

➥ Collected volume of grains (Crop years 2023/2024 & 2024/2025): tons

☐ Trading volumes of grains among the EU Member States

➥ Purchased volume from collectors (Crop years 2023/2024 & 2024/2025): tons

☐ Importing volumes of grains into the EU *

➥ Imported volume into the EU (Crop years 2023/2024 & 2024/2025): tons

☐ Other, please specify:

* (harvesting time (**for grains, including rice**) for crop year 2023-2024 goes from **April 2023 to November 2023** (from **April 2024 to November 2024,** regarding **crop** year 2024-2025) in Northern hemisphere exporting countries (i.e., US, Canada, Russia, Ukraine, CIS countries, etc.) and from **September 2023 to June 2024** (from **September 2024 to June 2025** regarding crop year 2024-2025) in Southern hemisphere exporting countries (i.e., Brazil, Argentina, Australia, China, India, ASEAN countries, etc)

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SECTION 1. MINIMISING RISKS POSED BY MYCOTOXINS IN THE FIELD (ONLY for agrosupply members)

1.1 . Do you specifically advise farmers on mycotoxins management?

☐ NO (if no, please go to SECTION 2)
☐ YES

1.2 . How do you manage risks of mycotoxins in the field? (more than one answer is possible)

☐ 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 farmers, what kind of approach to manage mycotoxins are you using (more than one answer is possible)

☐ Meteorological data
☐ A forecast model for Fusarium or mycotoxins risk
☐ No model
☐ Others means (please describe)

1.4.1. In case you apply the Forecast Model, by whom has it been proposed?

☐ Plant protection companies
☐ Seed breeders
☐ Technical institutes
☐ Public authorities

1.5 . After advising farmers, the management of mycotoxins risks at farm level:

☐ Improves
☐ Stagnates
☐ Worsens

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SECTION 2. SAMPLING, ANALYSIS AND DETECTION OF MYCOTOXINS (ONLY for grain collectors and traders)

2.1. Do you carry out sampling in your lots for the detection of mycotoxins?

☐ NO (if no, please go to SECTION 3)
☐ YES:

2.1.1 If YES, which mycotoxin/s are you analyzing and in which crop/s? Please tick the cells of the table below for each crop/mycotoxin combination

	Wheat	Barley	Oats	Maize/Corn	Other *(please specify which crop/s)*
Zearalenon (ZEA/ZON)	☐	☐	☐	☐	☐
Fumonisins (B1; B2 etc)	☐	☐	☐	☐	☐
Deoxynivalenol (DON) and its acetylated and modified forms (3-Ac-DON; 15-Ac-DON; DON3G)	☐	☐	☐	☐	☐
T-2/HT-2 (and their sums)	☐	☐	☐	☐	☐
Ochratoxin A (OTA)	☐	☐	☐	☐	☐
Aflatoxins (B1, B2, G1, G2)	☐	☐	☐	☐	☐
Nivalenol	☐	☐	☐	☐	☐
Ergot sclerotia/alkaloids	☐	☐	☐	☐	☐
Enniatins	☐	☐	☐	☐	☐
Other *(please specify)*	☐	☐	☐	☐	☐

2.1.2 If YES, can you please explain in detail how your company is assessing the risk for certain myco/crop combinations? – please specify

2.2. Which sampling method/s is/are used by your company for mycotoxins analyses?

☐ Official controls Regulations (EU Reg. 401/2006 (food) and/or EU Reg. 691/2013 (feed)
☐ CEN method EN/ISO 24333:2009
☐ Internal method – please specify in other
☐ Contractual method (e.g., GAFTA 124, FOSFA)) – please specify
☐ An aflatoxin protocols (e.g., GMP+, EFISC-GTP, etc) – please specify
☐ Other

2.2.1 Which constraints have you experienced in sample taking for mycotoxin analysis? – please specify

2.3. According to your activities, when do you test your lots for mycotoxins? (more than one answer is possible)

	Before harvest	At harvest (from farmers to collectors)	In store	At loading before transport (e.g., loading of trucks/vessels/etc.)	At delivery (to first processing industry)
Collector	☐	☐	☐	☐	☐
EU trade	☐	☐	☐	☐	☐
Import	☐	☐	☐	☐	☐

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2.4. Which frequency of testing are you applying? (more than one answer is possible)

- ☐ Systematic for all entries
- ☐ Based on a monitoring plan
- ☐ Based on a monitoring plan and risk assessment (please specify in other)
- ☐ Other

2.5. Are you certified under any food and/or feed safety management schemes (for example EFISC-GTP Code, GMP+FSA, GMP of OVOCOM, FEMAS, UFAS, TASCC, Q&S, CSA-GTP, GTAS, ISO 22000, etc.)

- ☐ Yes
- ☐ No

2.5.1 If YES, please specify under which of the above-mentioned certification scheme/s you are accredited

2.6 Do you carry out visual tests?

- ☐ Yes, only visual tests
- ☐ Yes, together with rapid test systems
- ☐ No

2.7 Do you carry out your own mycotoxins analysis at your company?

- ☐ Yes
- ☐ No

2.7.1 If YES, which kind of method of rapid test do you use for mycotoxin detection at your company?

- ☐ Bandage kit (Elisa semi-quantitative)
- ☐ Quantitative analysis (Elisa)
- ☐ Others (please, specify)

2.7.2 Who is/are your supplier(s) of rapid tests?

	Bandage kit (Elisa semi-quantitative)	Elisa (quantitative)
Charm	☐	☐
Neogen	☐	☐
R-Biopharm	☐	☐
Other (please indicate)		

2.8 Do you carry out analysis to evaluate the presence of mycotoxins by external laboratories?

- ☐ Yes
- ☐ No

2.8.1 If YES, what is the purpose of the external analysis?

- ☐ Because you do not have your own testing equipment
- ☐ To complement your internal analysis
- ☐ To validate your internal analysis

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2.8.2 If YES, what is the methodology used by the lab?

- ☐ Enzyme-linked immunosorbent assay (ELISA) method
  - ☐ Standardised method (please specify):
  - ☐ Internal method (please specify):
- ☐ HPLC technique
- ☐ GC technique
- ☐ I don't know
- ☐ Other

2.9 Is your testing laboratory accredited for mycotoxins in questions (see above) in accordance with the international standard ISO/IEC 17025:2017?

- ☐ Yes
- ☐ Yes, but only for the following mycotoxins (please specify which ones):
- ☐ No
- ☐ I don't know
- ☐ Other

SECTION 3. REGULATION ENFORCEMENT AND CONTROLS

3.1. Have you been already controlled in the framework of the official regulation for mycotoxins in foodstuffs?

- ☐ Yes
- ☐ No

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

3.1.3 Which constraints (if any) have you experienced during official controls (i.e. sample preparation and taking, delays in reporting, transparency, etc)? Please specify

3.2. Apart from exceeding regulatory limits, did you have to conduct a product recall?

- ☐ Yes
- ☐ No

3.3 If yes, was that recall the result of an official control or due to a commercial complaint?

- ☐ Official control
- ☐ Commercial complaint

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SECTION 4. GENERAL OPEN QUESTIONS

4.1 Please list which measures you take to prevent and mitigate mycotoxins risks in your business, including the ones asked by your customers

4.2 Please list which measures your suppliers declare to prevent and mitigate mycotoxins risks in the field

4.3 Please estimate which mycotoxins might become more prevalent in the future (next 10 years) in the country/ies you source your grains and oilseeds, also in relationship with effect of climate change

4.4 Which constraints have you experienced or will you expect when new regulatory levels for mycotoxins are going to be proposed/voted in the EU?

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ANNEX 2: METHOD FOR REPLIES PROCESSING

- **Method design**
  - The replies sent by the operators are assumed to be representative for the whole country they represent.
  - Each participant specified the volume of cereals traded; the total volumes mentioned representing 27% of the total volume of cereals traded in those countries.

- **Calculation steps and formula**
  - The reply to each question was weighted by the total contributions received for that country thus returning the country's-dependent mean reply: R_C (%)
  - The volume of grains traded within each country was divided by the volume of grains traded within all the countries participating in the survey, thus obtaining W_C.
  - The overall result, R (%), was obtained as the average of all member states-dependent mean (R_C) weighted by W_{MS} (weight of the Member State (and UK)).

$$R=\sum_{MST} R_C * W_C$$

Where R (%) = overall result

R_C = mean reply for Member State (and UK) (%)

$W_C = \frac{V_C}{V_{All}}$; where V_C = Volume traded in the participant country

V_{All} = Total volume of countries participating to the survey

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