mycotoxin contamination diagnosis

How do I know I have a mycotoxin problem?

January 2025
Mycotoxin Product Management EMEA

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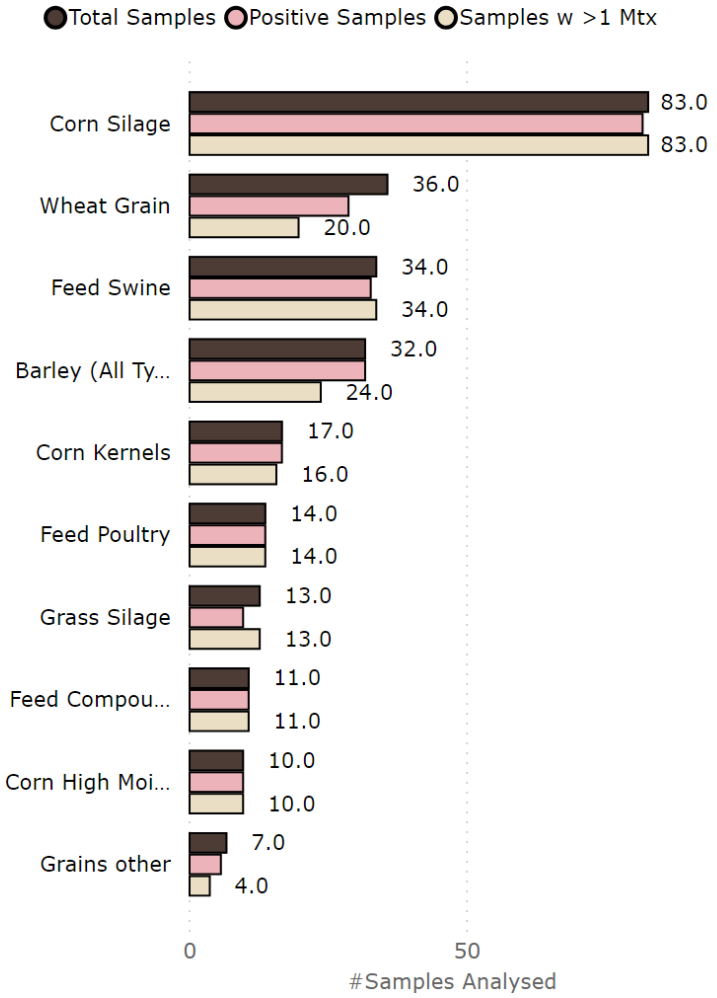
Baltics Country

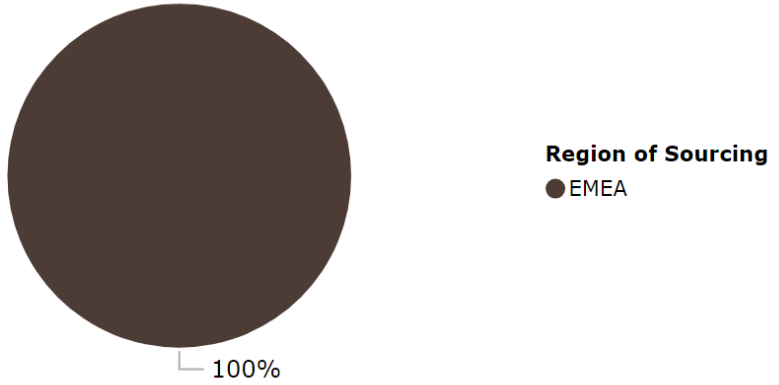
Overview of Samples

Date: 1/1/2024 – 12/31/2024 | Region of Sourcing: All | Subregion of Sourcing: All | Country of Sourcing: Multiple selections | Test Method: All | Sample Type: All

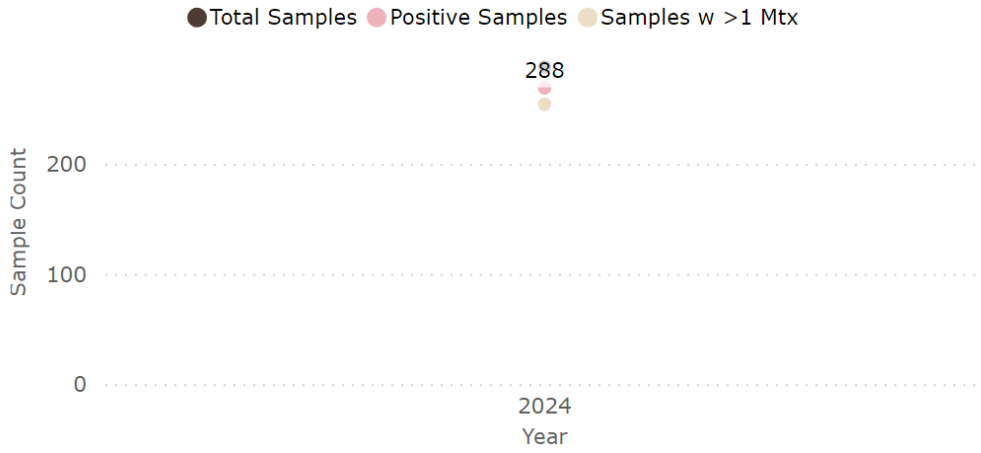
Top 10 Commodities Analysed



Sample Count by Region (Sourcing)



Evolution of Samples Tested



Commodities	Total Samples
Corn Silage	83
Wheat Grain	36
Feed Swine	34
Barley (All Types)	32
Corn Kernels	17
Feed Poultry	14
Grass Silage	13
Feed Compound Ruminant	11
Corn High Moisture	10
Grains other	7
Other Silage	5
Rye (All Types)	5
Straw (All Types)	5
Oat (All Types)	4
Triticale (All Types)	4
Beet Pulp	3
TMR/PMR (Total or Partial Mixed Ration Ruminant)	3
Hay (All Types)	1
Soya Full Fat	1
Total	**288**

Total Samples
288

Baltics Country

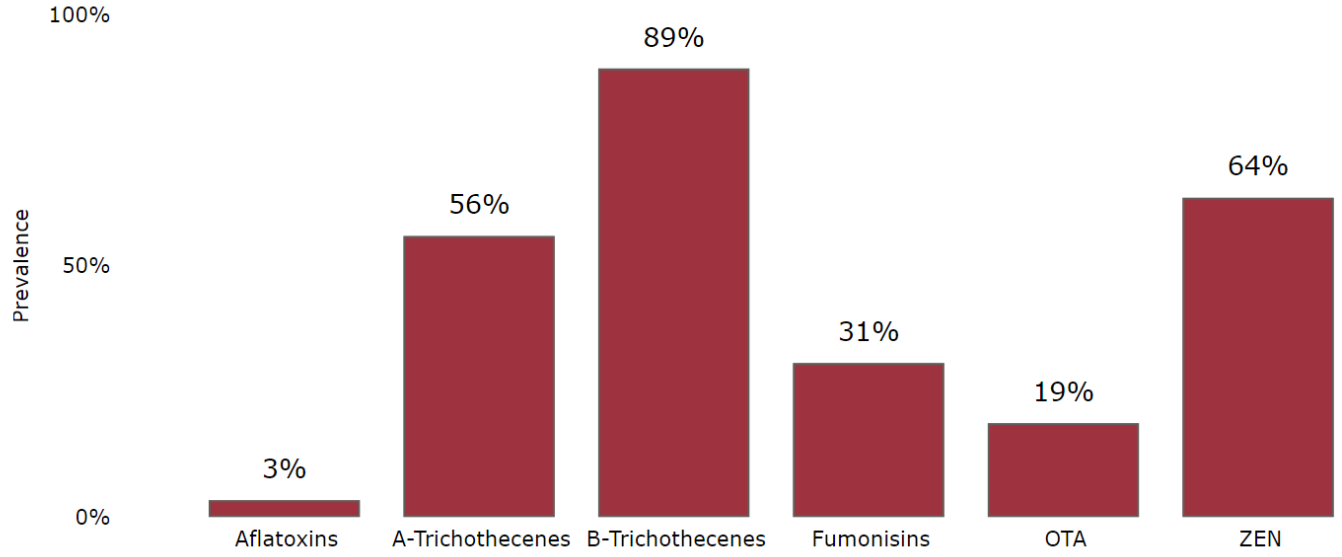
Overview of Contamination

Download Snapshots

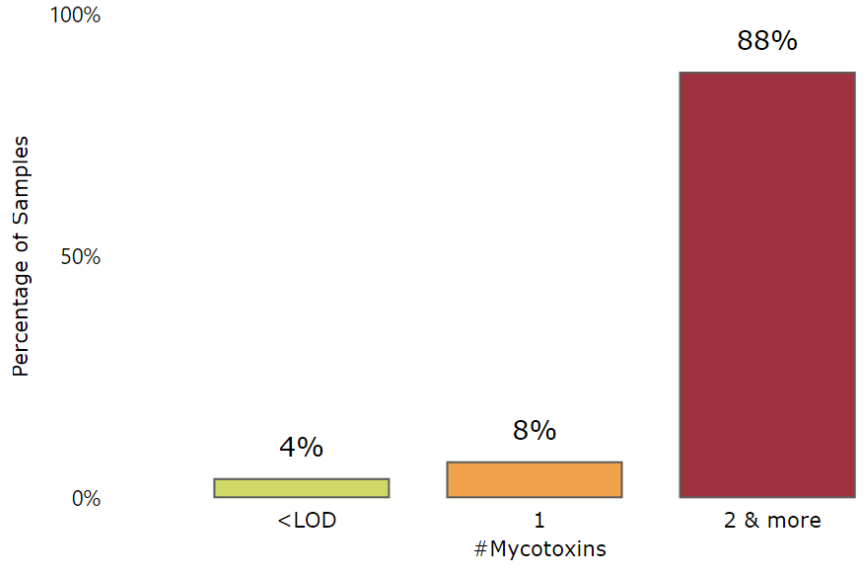
Date: 1/1/2024 – 12/31/2024 | Region of Sourcing: All | Subregion of Sourcing: All | Country of Sourcing: Multiple selections | Test Method: All | Sample Type: All

	Aflatoxins	A-Trichothecenes	B-Trichothecenes	Fumonisins	OTA	ZEN
Total Samples	209	288	288	209	209	288
Prevalence	3%	56%	89%	31%	19%	64%
% Above Risk Threshold	2%	38%	64%	0%	2%	25%
Average of Positives (ppb)	2	137	1,695	74	5	138
Median of Positives (ppb)	2	80	286	60	2	22
Maximum (ppb)	6	3,976	34,103	555	28	1,673

Mycotoxin Group Prevalence



Mycotoxin Co-contamination



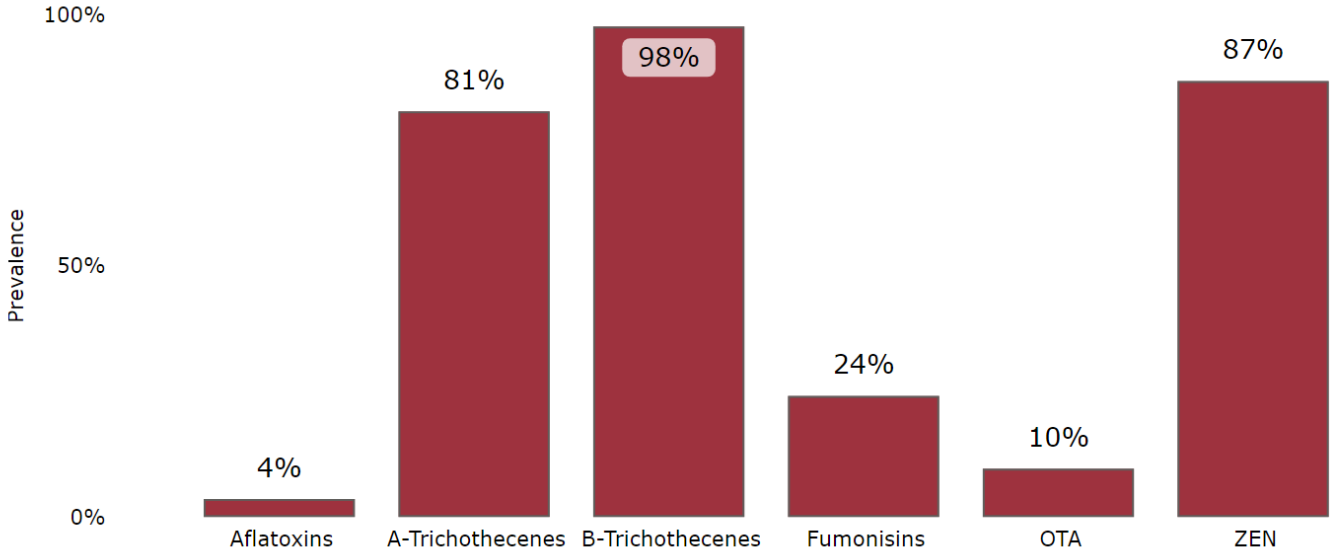
Total Samples
83

Overview of Contamination

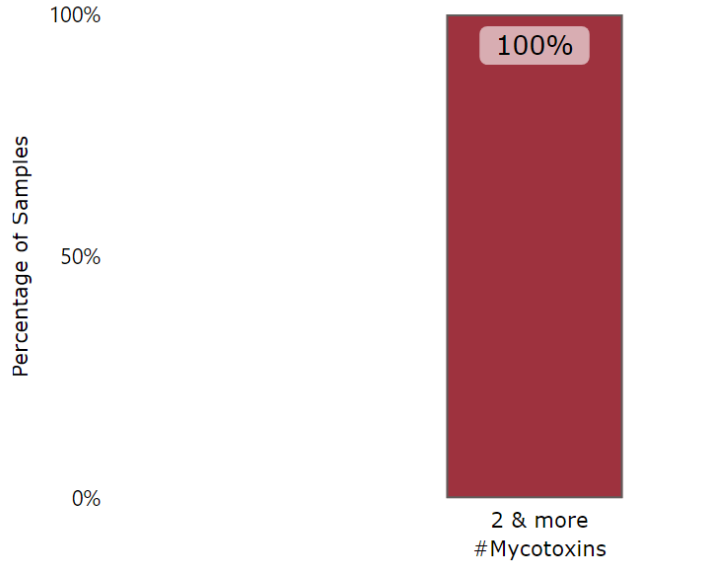
Date: 1/1/2024 – 12/31/2024 | Region of Sourcing: All | Subregion of Sourcing: All | Country of Sourcing: Multiple selections | Test Method: All | Sample Type: Corn Silage

	Aflatoxins	A-Trichothecenes	B-Trichothecenes	Fumonisins	OTA	ZEN
Total Samples	83	83	83	83	83	83
Prevalence	4%	81%	98%	24%	10%	87%
% Above Risk Threshold	2%	65%	94%	1%	2%	59%
Average of Positives (ppb)	2	180	3,825	105	5	272
Median of Positives (ppb)	2	112	1,155	90	3	105
Maximum (ppb)	2	1,084	34,103	555	15	1,673

Mycotoxin Group Prevalence



Mycotoxin Co-contamination



Total Samples
83

Contamination Map

Date		Region of Sourcing	Subregion of Sourcing	Country of Sourcing	Mycotoxin	Test Method	Sample Type
1/1/2024	12/31/2024	All	All	Multiple selections	B-Trichothecenes	All	Corn Silage

Most Sensitive Risk Threshold for: B-Trichothecenes

150

Legend for Prevalence & Risk

0-25%	26-50%	51-75%	76-100%	No samples

Low Prevalence — High Prevalence

Mycotoxin Group	Mycotoxin	Total Samples	Prevalence	Samples above Risk Threshold	Average of Positives (ppb)	Median of Positives (ppb)
B-Trichothecenes	Deoxynivalenol	83	96%	90%	2,641	966
	Nivalenol	83	47%	34%	389	316
	Deoxynivalenol-3-Glucoside	83	45%	27%	493	206
	15-Acetyldeoxynivalenol	83	34%	18%	241	153
	3-Acetyldeoxynivalenol	83	5%	5%	14,539	11,633
	Fusarenon X	83	1%	1%	210	210
Average Values for Mycotoxin Group		**83**	**98%**	**94%**	**3,825**	**1,155**

Baltics Country

Mycotoxin Ranking

Note: This page has been filtered for samples that have been tested for 10 or more mycotoxins.

Date	Lab	Test Method	Region of Origin	Country of Origin	Region of Sourcing	Country of Sourcing	Species	Sample Type
1/1/2024 – 12/31/2024	All	All	All	Multiple selections	All	Multiple selections	All	Corn Silage

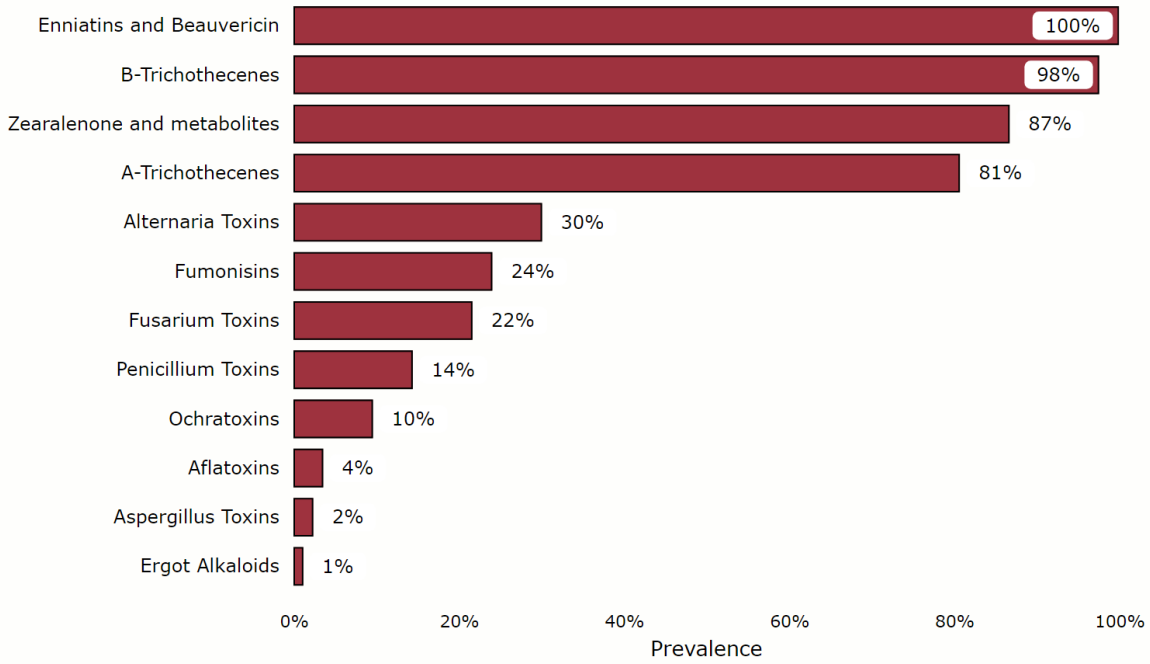
Species Threshold: All

Threshold Selection: **Moderate** | Medium | High

Selected Threshold Values

Aflatoxins	A-Trichothecenes	B-Trichothecenes	Ergot Alkaloids	Fumonisins	Ochratoxins	Zearalenone and metabolites
2.00	50.00	150.00	30.00	500.00	10.00	50.00

Mycotoxin Group Ranking



Mycotoxin Ranking

Mycotoxin	Prevalence	Average Positive	Median Positive	Samples	Samples Above Risk Threshold
Enniatin B	100%	80	53	83	
Deoxynivalenol	96%	2,641	966	83	90%
Enniatin B1	95%	29	16	83	
Beauvericin	93%	74	52	83	
Zearalenone	87%	272	105	83	59%
HT-2 Toxin	81%	164	93	83	60%
Enniatin A1	73%	13	7	83	
Nivalenol	47%	389	316	83	34%
Deoxynivalenol-3-Glucoside	45%	493	206	83	27%
15-Acetyldeoxynivalenol	34%	241	153	83	18%
Alternariol	30%	20	15	83	
Enniatin A	27%	21	20	83	
Fumonisin B1	24%	55	34	83	0%
Moniliformin	22%	40	20	83	
15-Acetoxyscirpenol	16%	50	50	83	16%
Fumonisin B2	16%	64	60	83	0%
T-2 Toxin	14%	32	25	83	1%
Mycophenolic Acid	11%	123	50	83	
Ochratoxin A	10%	5	3	83	2%

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Total Samples
17

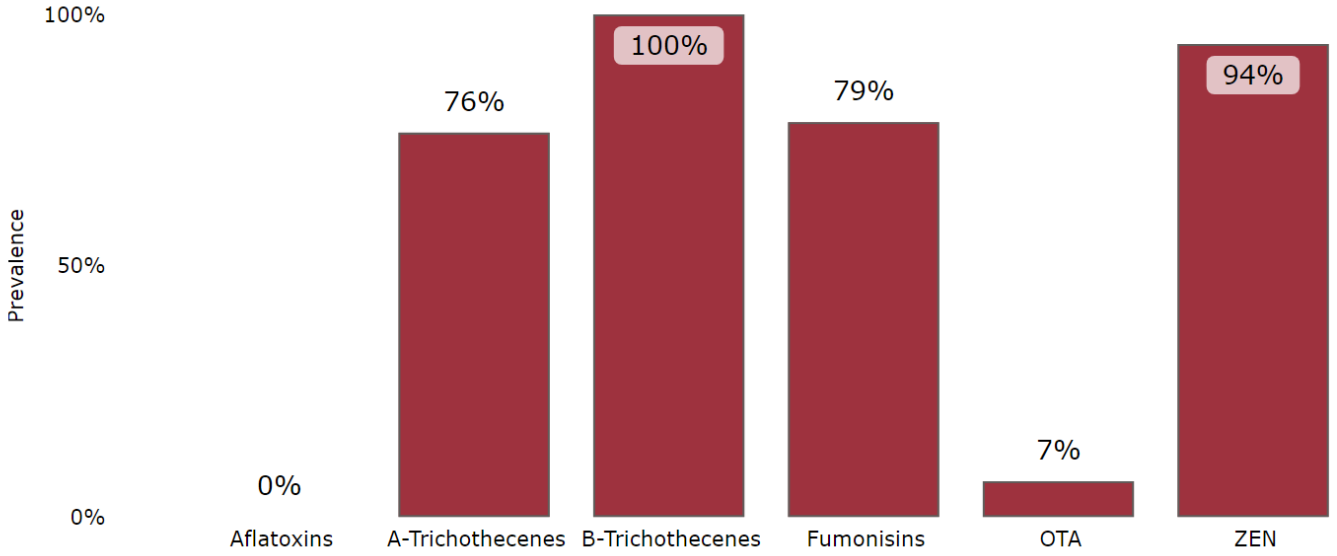
Baltics Country

Overview of Contamination

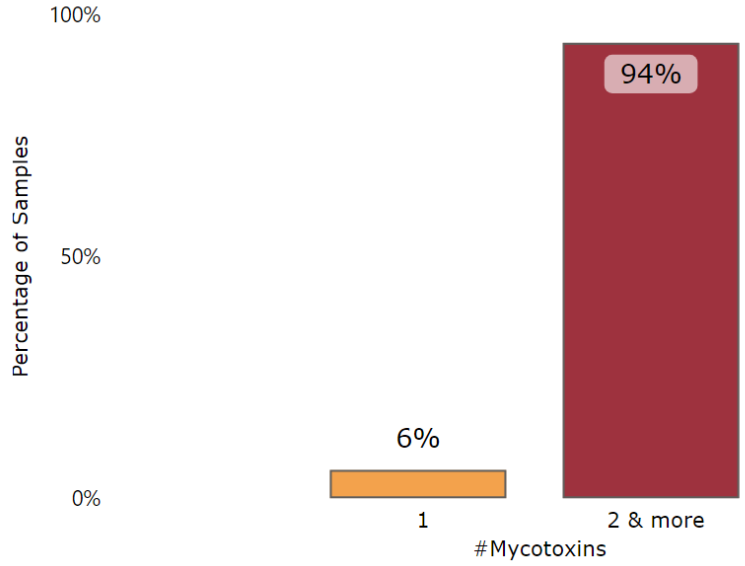
Date 1/1/2024 – 12/31/2024 | *Region of Sourcing* All | *Subregion of Sourcing* All | *Country of Sourcing* Multiple selections | *Test Method* All | *Sample Type* Corn Kernels

	Aflatoxins	A-Trichothecenes	B-Trichothecenes	Fumonisins	OTA	ZEN
Total Samples	14	17	17	14	14	17
Prevalence	0%	76%	100%	79%	7%	94%
% Above Risk Threshold	0%	53%	88%	0%	0%	35%
Average of Positives (ppb)		377	1,586	61	2	161
Median of Positives (ppb)		80	353	60	2	29
Maximum (ppb)		3,976	6,494	106	2	1,426

Mycotoxin Group Prevalence



Mycotoxin Co-contamination



Baltics Country

Mycotoxin Ranking

Note: This page has been filtered for samples that have been tested for 10 or more mycotoxins.

Date	Lab	Test Method	Region of Origin	Country of Origin	Region of Sourcing	Country of Sourcing	Species	Sample Type
1/1/2024 – 12/31/2024	All	All	All	Multiple selections	All	Multiple selections	All	Corn Kernels

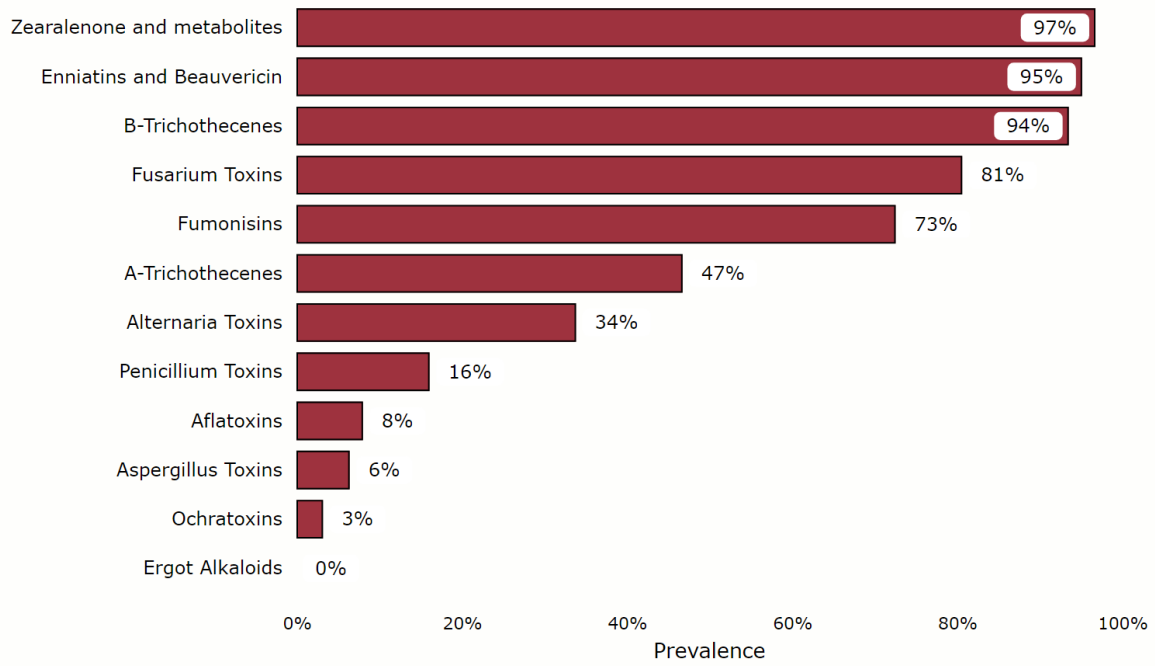
Species Threshold: All

Threshold Selection: Moderate | Medium | **High**

Selected Threshold Values

Aflatoxins	A-Trichothecenes	B-Trichothecenes	Ergot Alkaloids	Fumonisins	Ochratoxins	Zearalenone and metabolites
4.00	100.00	200.00	300.00	1,000.00	100.00	100.00

Mycotoxin Group Ranking



Mycotoxin Ranking

Mycotoxin	Prevalence	Average Positive	Median Positive	Samples	Samples Above Risk Threshold
Zearalenone	97%	162	94	62	45%
Beauvericin	92%	59	35	62	
Deoxynivalenol	92%	1,283	786	62	77%
Enniatin B	89%	16	7	62	
Moniliformin	81%	110	78	62	
Enniatin B1	76%	7	3	62	
Deoxynivalenol-3-Glucoside	74%	252	211	62	40%
Fumonisin B1	68%	92	66	62	0%
Fumonisin B2	65%	46	30	62	0%
15-Acetyldeoxynivalenol	53%	270	249	62	29%
Enniatin A1	40%	5	3	62	
T-2 Toxin	35%	45	30	62	3%
Alternariol	34%	11	10	62	
Fumonisin B3	29%	33	30	62	0%
3-Acetyldeoxynivalenol	24%	138	100	62	3%
HT-2 Toxin	24%	76	50	62	2%
Mycophenolic Acid	16%	58	50	62	
Nivalenol	11%	107	62	62	2%
Aflatoxin B1	8%	7	7	62	5%

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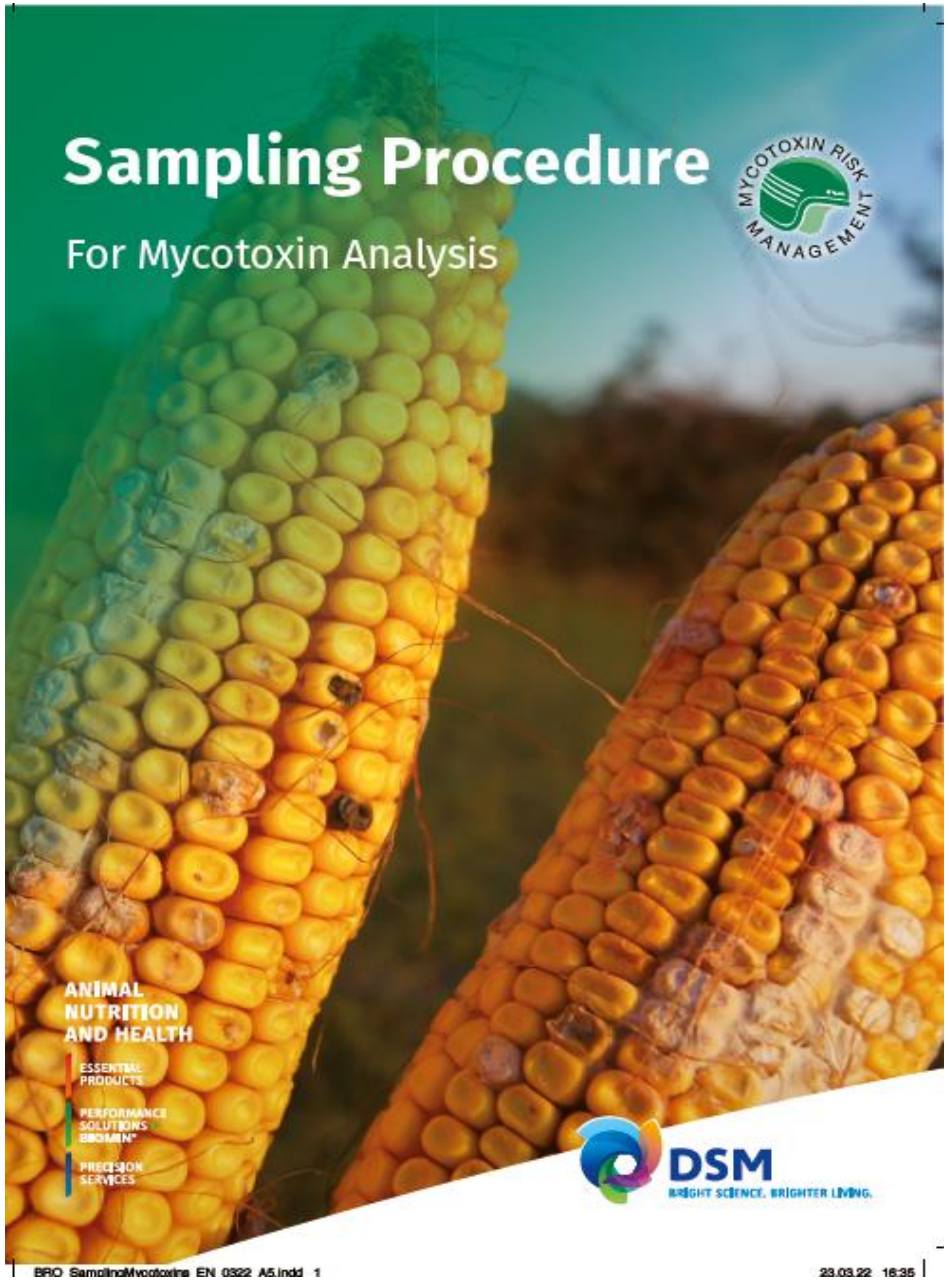
Is my herd at risk?
How we diagnose if cows have mycotoxin problem



Spectrum Top® 50

Sampling Procedure

MYCOTOXIN RISK MANAGEMENT

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Depending on the type of product that will be sampled, a minimum number of incremental samples should be collected in order to obtain a representative sample for analysis. See below the basic steps for a successful sampling procedure:

- Collect an adequate number of incremental samples (100 g) according to lot weight.
- Mix incremental samples thoroughly to form the aggregate sample (no less than 1 kg)
- Prepare the laboratory sample: Collect scoops from different points in the aggregate (e.g. five 200 g samples for an aggregate of 1 kg)
- Place into an adequate container, label samples properly and store accordingly
- Send samples to laboratory for analysis

Spectrum Top® 50 Workflow

Spectrum Top 50® is fast and offers the most complete view of mycotoxin contamination of your feed.

1 Sample collected by customer / DSM representative

2 Sample sent to Romer Labs in Tulln / US / Singapore with order form

3 LC-MS / MS analysis & data evaluation: **5 working days**

4 Interpreted reports are sent to DSM representative or customer

spectrum TOP 50

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ANIMAL NUTRITION AND HEALTH

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Mycotoxin Risk Management

Risk
Evaluate the risk

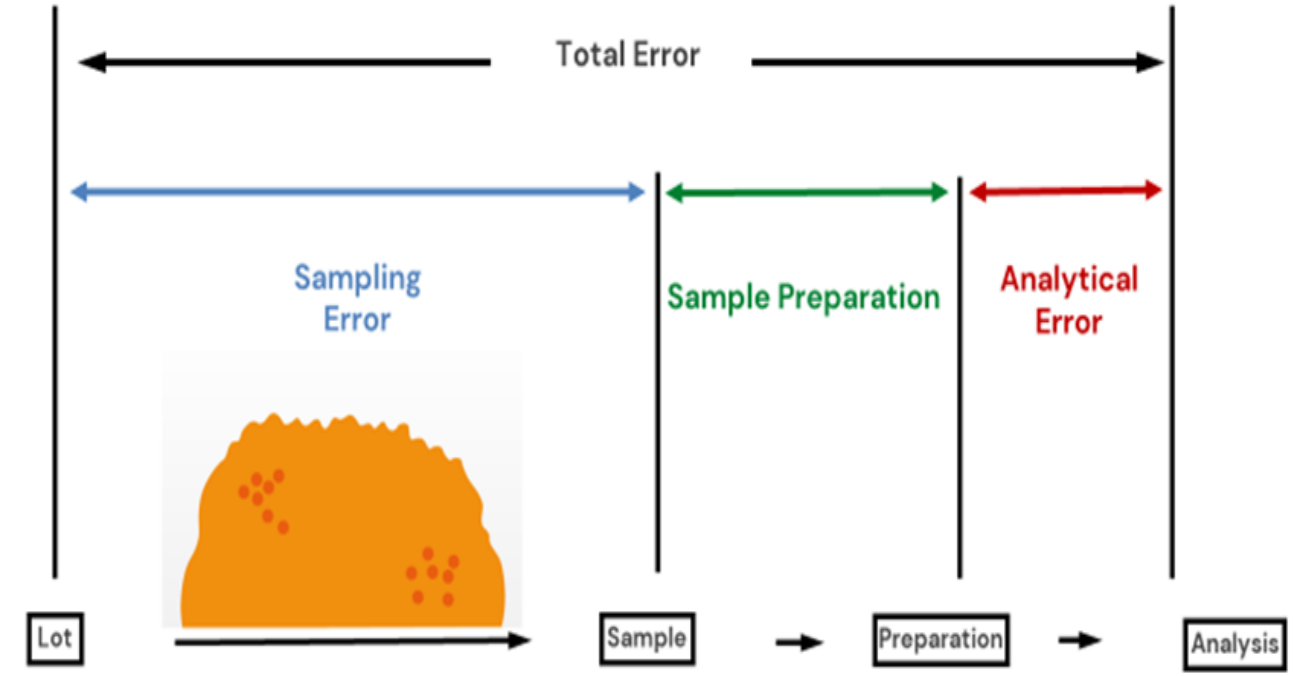
Mycotoxin
Mycotoxin Analysis

Management
Deactivation of the mtx

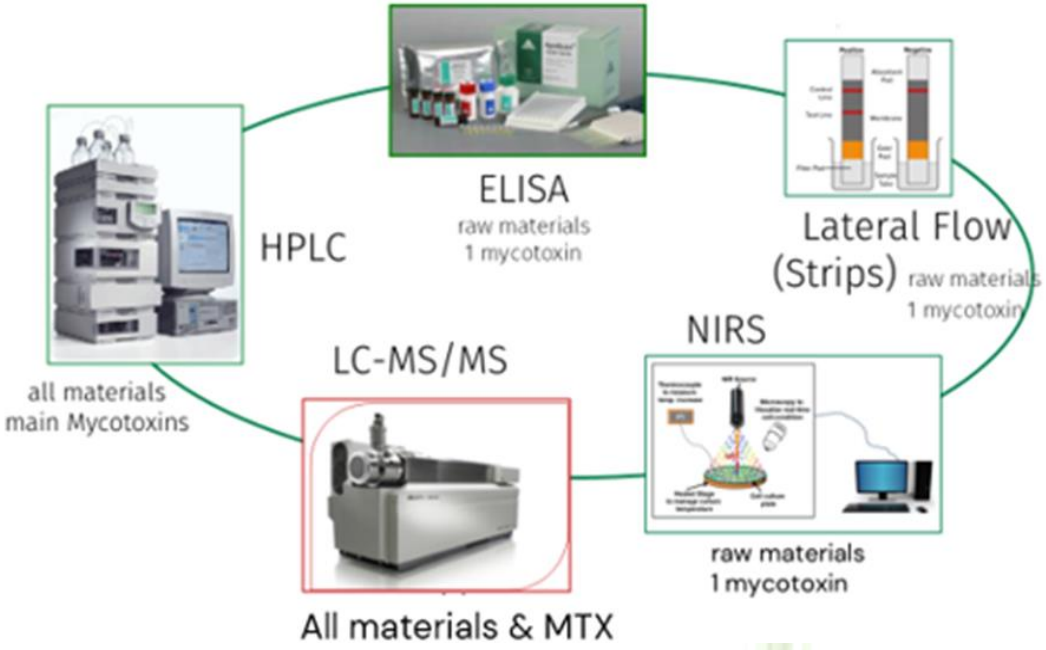
Testing methods

Sampling guidelines

Mycotoxin Testing Error



Selecting proper testing method



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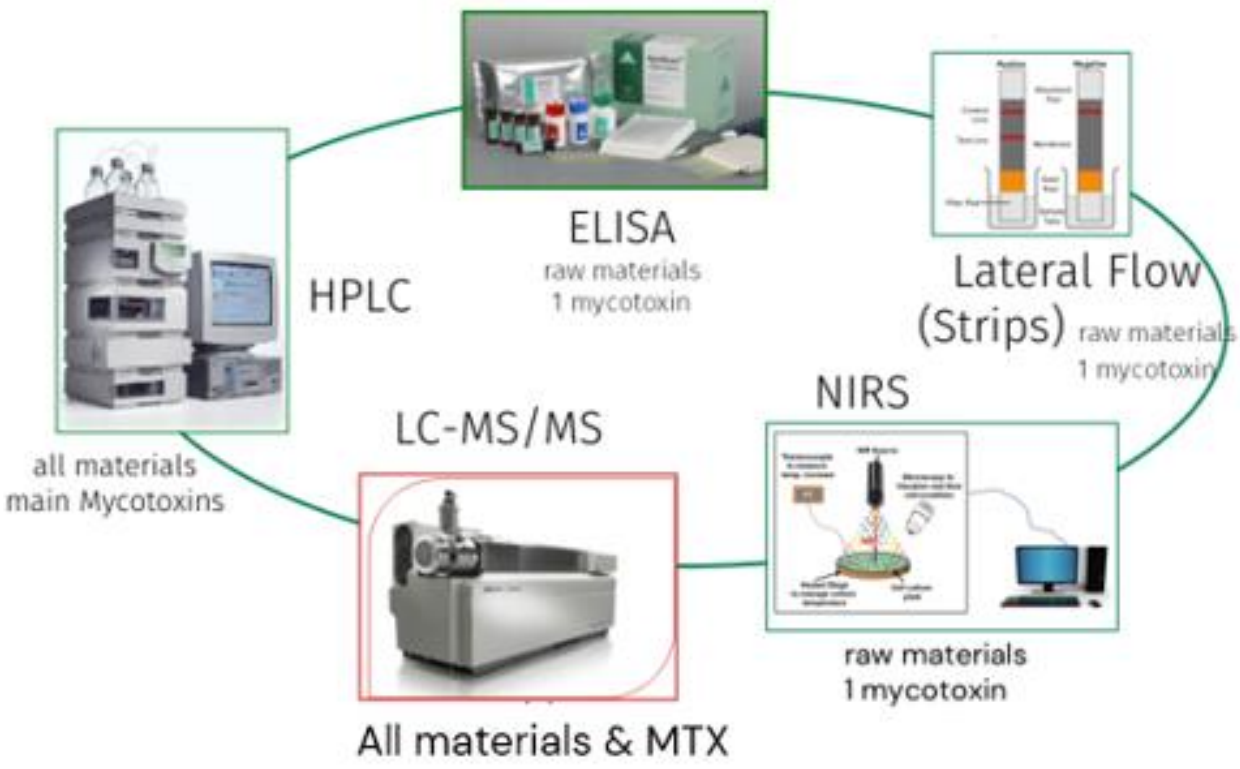
The most comprehensive method

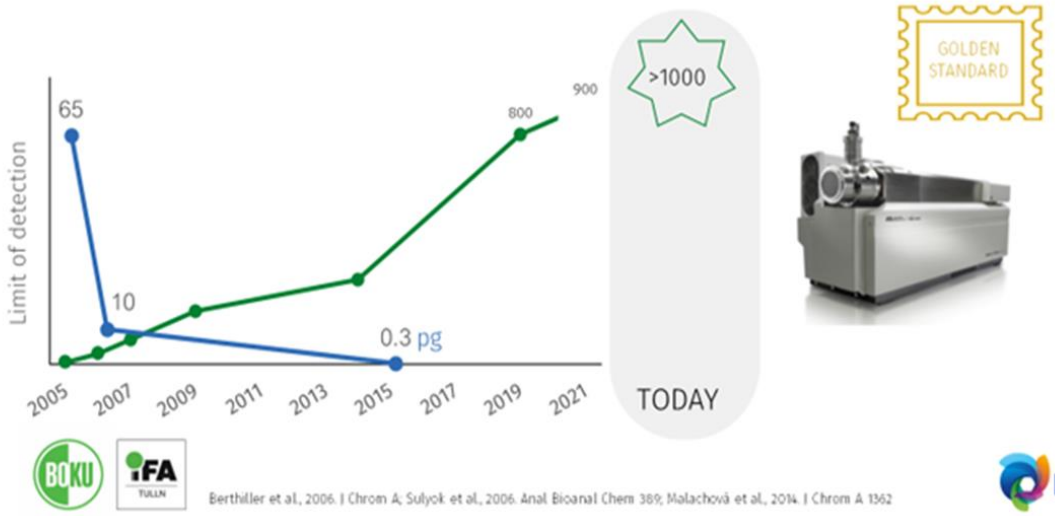
test errors & test limitations

Selecting proper testing method



Mycotoxin analyses LC-MS/MS

Simultaneous detection of multiple toxins in multiple matrices



Testing method

Sampling method

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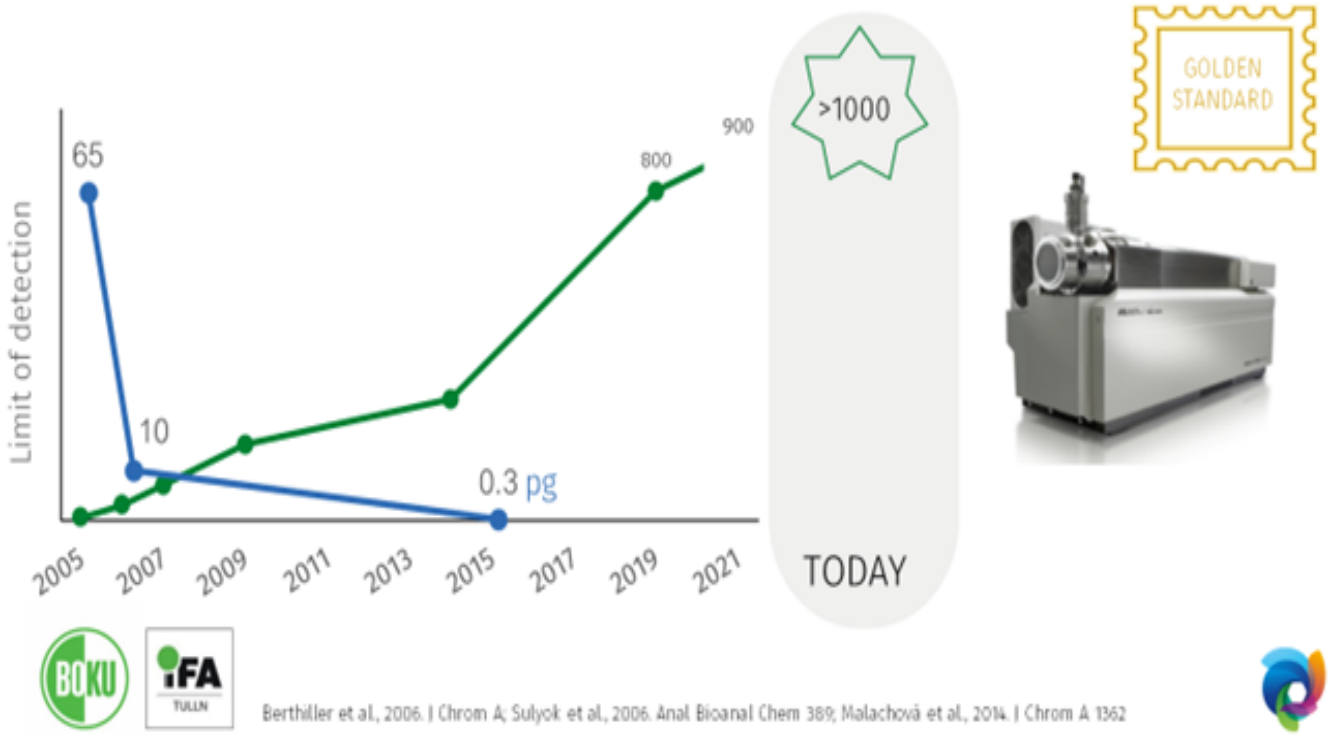
The most comprehensive method

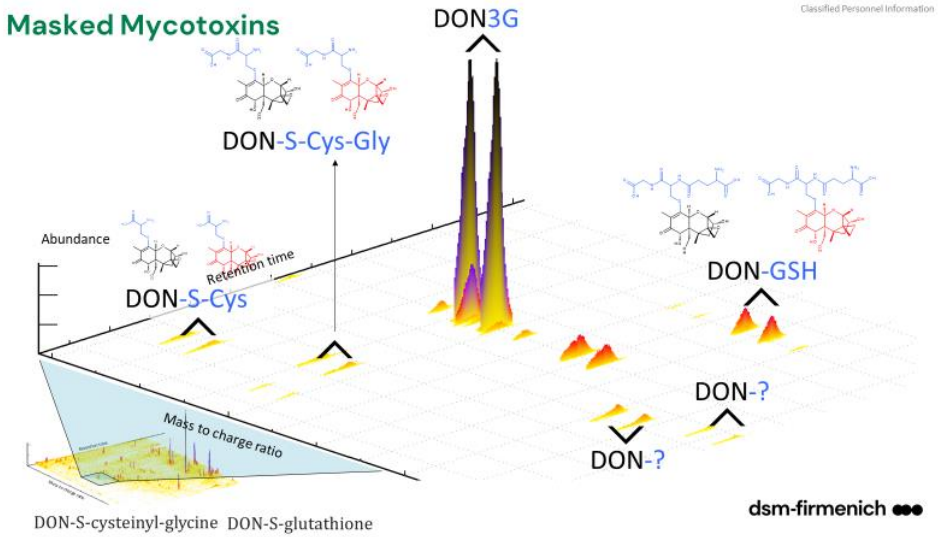
test errors & test limitations

Emerging mycotoxins

Mycotoxin analyses LC-MS/MS

Simultaneous detection of multiple toxins in multiple matrices





BOKU IFA TULLN

Berthiller et al., 2006. J Chrom A; Sulyok et al., 2006. Anal Bioanal Chem 389; Malachová et al., 2014. J Chrom A 1362

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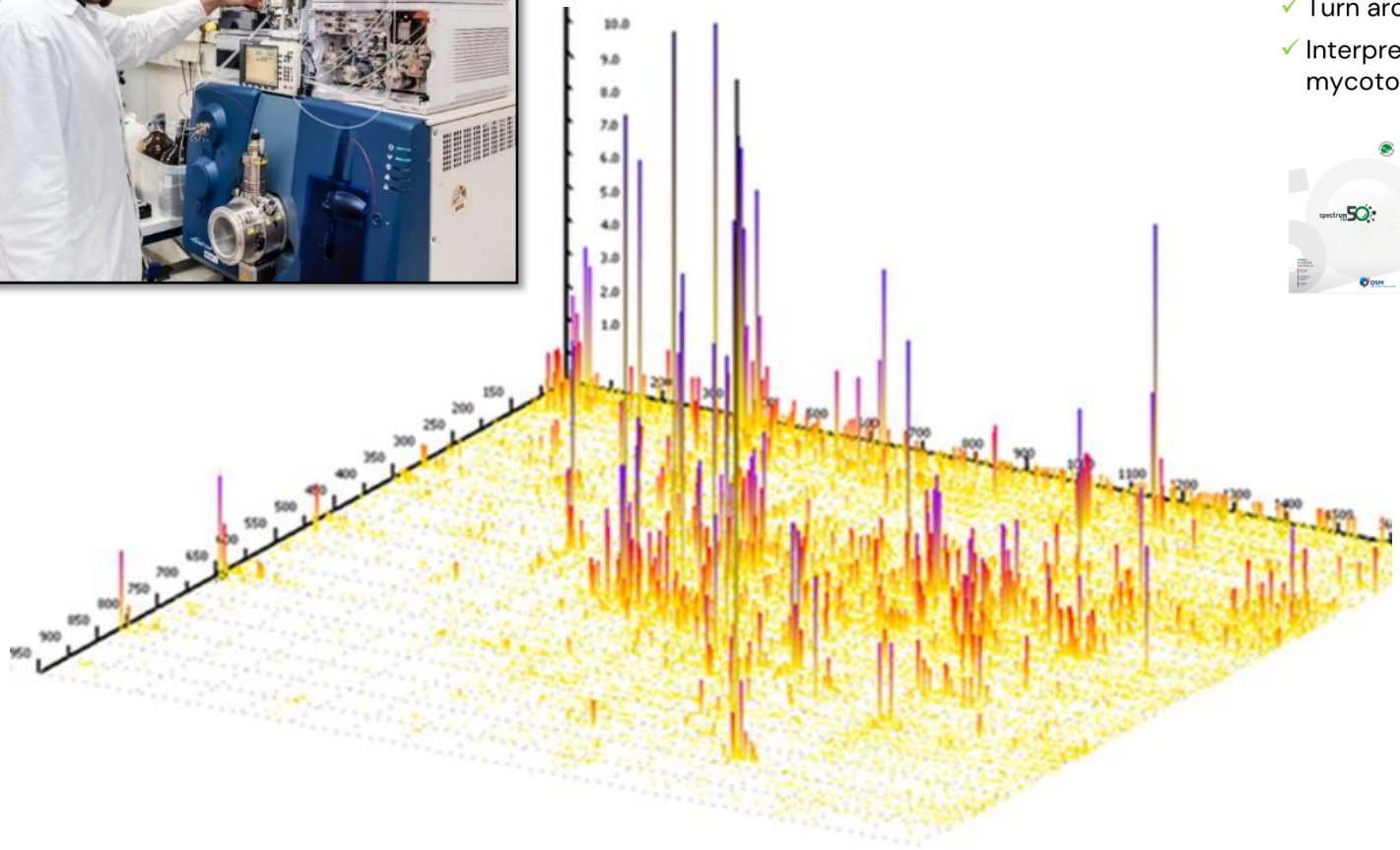
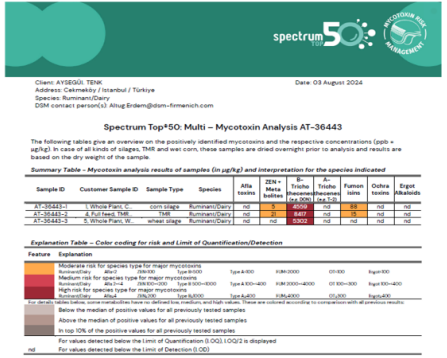
The most comprehensive method

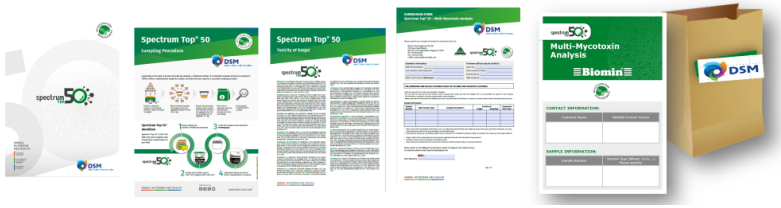
test errors & test limitations



Spectrum Top® 50



- ✓ Method was developed by Romer Labs
- ✓ Analysis is done locally: Romer Labs Austria/ Singapore
- ✓ **More than 50 different mycotoxins and metabolites**
  - ✓ frequently occurring mycotoxins
  - ✓ masked mycotoxins
  - ✓ emerging mycotoxins
- ✓ Turn around time: 10 working days upon sample receival in Romer Labs SG
- ✓ Interpreted report with risk assessment (species-specific) and concise information about mycotoxins analyzed



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Evaluation of Matrix Effects and Extraction Efficiencies of LC–MS/MS Methods as the Essential Part for Proper Validation of Multiclass Contaminants in Complex Feed

David Steiner, Rudolf Krska, Alexandra Malachová, Ines Taschl, and Michael Sulyok*

Cite this: *J. Agric. Food Chem.* 2020, 68, 12, 3868–3880

Publication Date: March 3, 2020

https://doi.org/10.1021/acs.jafc.9b07706

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Journal of Agricultural and Food Chemistry

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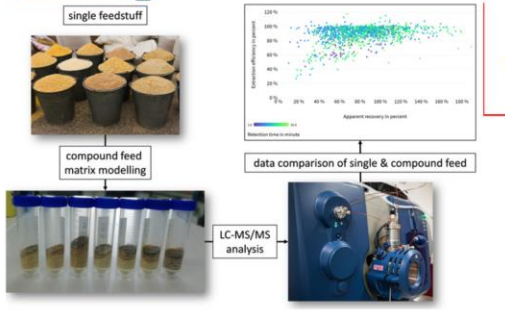

https://axial.acs.org/2021/06/07/jafc-research-article-of-the-year-award-2021/

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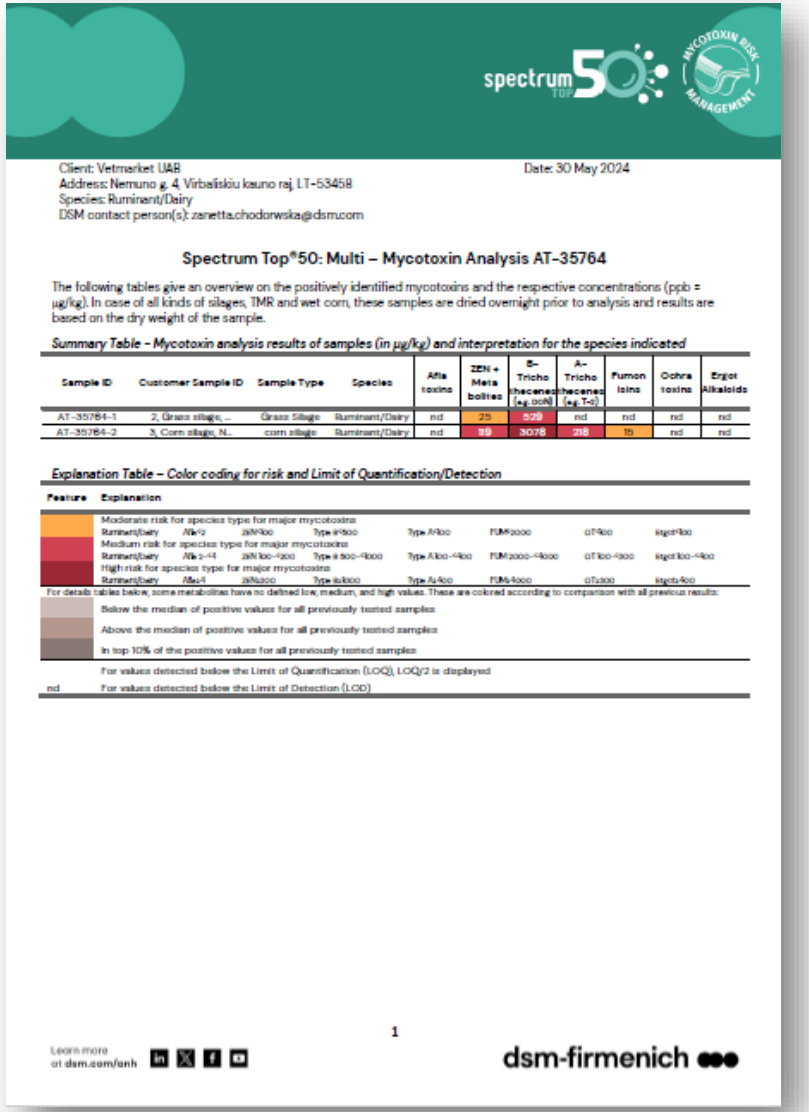
Mycotoxins analysis report



spectrum TOP 50 — MYCOTOXIN RISK MANAGEMENT

Client: Vetmarket UAB
Address: Nemuno g. 4, Virbališkiu kauno raj, LT-53458
Species: Ruminant/Dairy
DSM contact person(s): zanetta.chodorwska@dsm.com

Date: 30 May 2024

Spectrum Top®50: Multi – Mycotoxin Analysis AT-35764

The following tables give an overview on the positively identified mycotoxins and the respective concentrations (ppb = µg/kg). In case of all kinds of silages, TMR and wet corn, these samples are dried overnight prior to analysis and results are based on the dry weight of the sample.

Summary Table – Mycotoxin analysis results of samples (in µg/kg) and interpretation for the species indicated

Sample ID	Customer Sample ID	Sample Type	Species	Afla toxins	ZEN + Meta bolites	B-Tricho thecenes (e.g. DON)	A-Tricho thecenes (e.g. T-2)	Fumon isins	Ochra toxins	Ergot Alkaloids
AT-35764-1	2, Grass silage, ...	Grass Silage	Ruminant/Dairy	nd	25	529	nd	nd	nd	nd
AT-35764-2	3, Corn silage, N...	corn silage	Ruminant/Dairy	nd	89	3078	218	55	nd	nd

Explanation Table – Color coding for risk and Limit of Quantification/Detection

Feature	Explanation
	Moderate risk for species type for major mycotoxins
	Medium risk for species type for major mycotoxins
	High risk for species type for major mycotoxins
	For details tables below, some metabolites have no defined low, medium, and high values. These are colored according to comparison with all previous results:
	Below the median of positive values for all previously tested samples
	Above the median of positive values for all previously tested samples
	In top 10% of the positive values for all previously tested samples
	For values detected below the Limit of Quantification (LOQ), LOQ/2 is displayed
nd	For values detected below the Limit of Detection (LOD)

1

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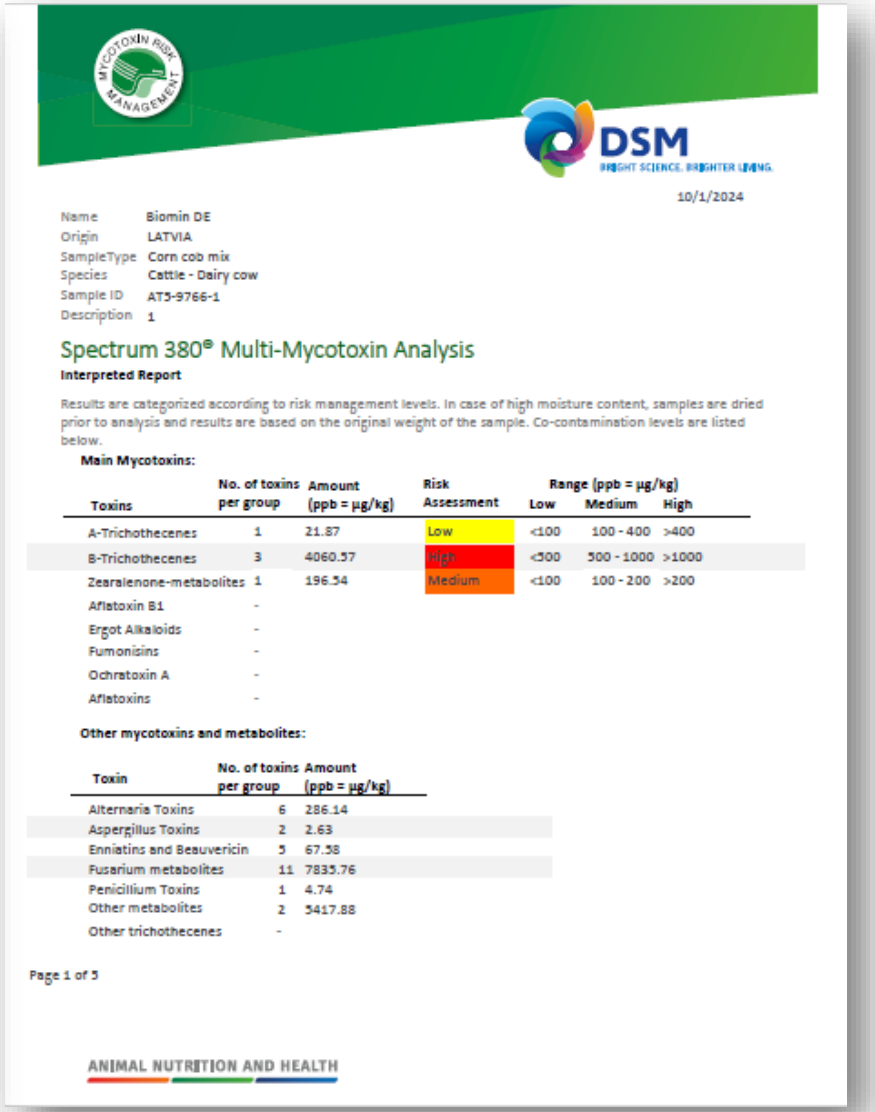

MYCOTOXIN RISK MANAGEMENT

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10/1/2024

Name Biomin DE
Origin LATVIA
SampleType Corn cob mix
Species Cattle - Dairy cow
Sample ID AT5-9766-1
Description 1

Spectrum 380® Multi-Mycotoxin Analysis

Interpreted Report

Results are categorized according to risk management levels. In case of high moisture content, samples are dried prior to analysis and results are based on the original weight of the sample. Co-contamination levels are listed below.

Main Mycotoxins:

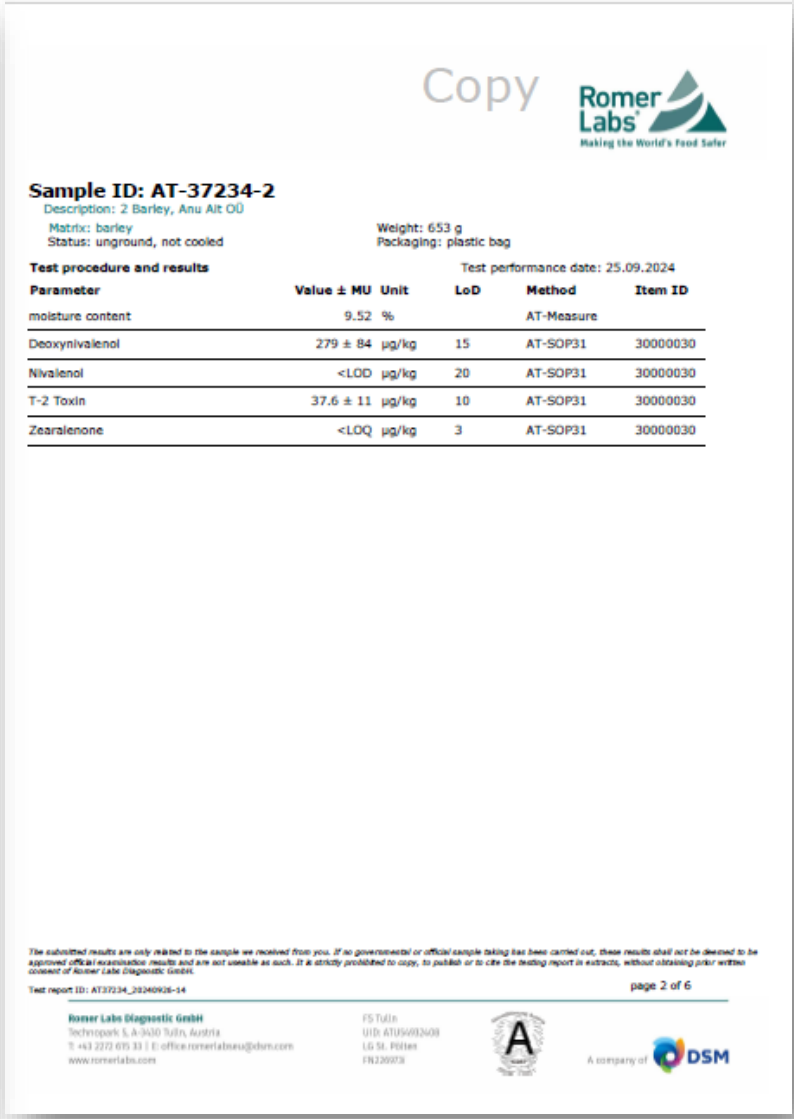
Toxins	No. of toxins per group	Amount (ppb = µg/kg)	Risk Assessment	Range (ppb = µg/kg) Low	Medium	High
A-Trichothecenes	1	21.87	Low	<100	100 - 400	>400
B-Trichothecenes	3	4060.57	High	<500	500 - 1000	>1000
Zearalenone-metabolites	1	196.54	Medium	<100	100 - 200	>200
Aflatoxin B1	-					
Ergot Alkaloids	-					
Fumonisins	-					
Ochratoxin A	-					
Aflatoxins	-					

Other mycotoxins and metabolites:

Toxin	No. of toxins per group	Amount (ppb = µg/kg)
Alternaria Toxins	6	286.14
Aspergillus Toxins	2	2.63
Enniatins and Beauvericin	5	67.58
Fusarium metabolites	11	7835.76
Penicillium Toxins	1	4.74
Other metabolites	2	5417.88
Other trichothecenes	-	

Page 1 of 5

ANIMAL NUTRITION AND HEALTH



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Sample ID: AT-37234-2

Description: 2 Barley, Anu Alt 00

Matrix: barley
Status: unground, not cooled

Weight: 653 g
Packaging: plastic bag

Test procedure and results

Test performance date: 25.09.2024

Parameter	Value ± MU	Unit	LoD	Method	Item ID
moisture content	9.52	%		AT-Measure	
Deoxynivalenol	279 ± 84	µg/kg	15	AT-SOP31	30000030
Nivalenol	<LOD	µg/kg	20	AT-SOP31	30000030
T-2 Toxin	37.6 ± 11	µg/kg	10	AT-SOP31	30000030
Zearalenone	<LOQ	µg/kg	3	AT-SOP31	30000030

The submitted results are only related to the sample we received from you. If no governmental or official sample taking has been carried out, these results shall not be deemed to be approved official examination results and are not useable as such. It is strictly prohibited to copy, to publish or to cite the testing report in extracts, without obtaining prior written consent of Romer Labs Diagnostic GmbH.

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A company of DSM

Symptoms in animals

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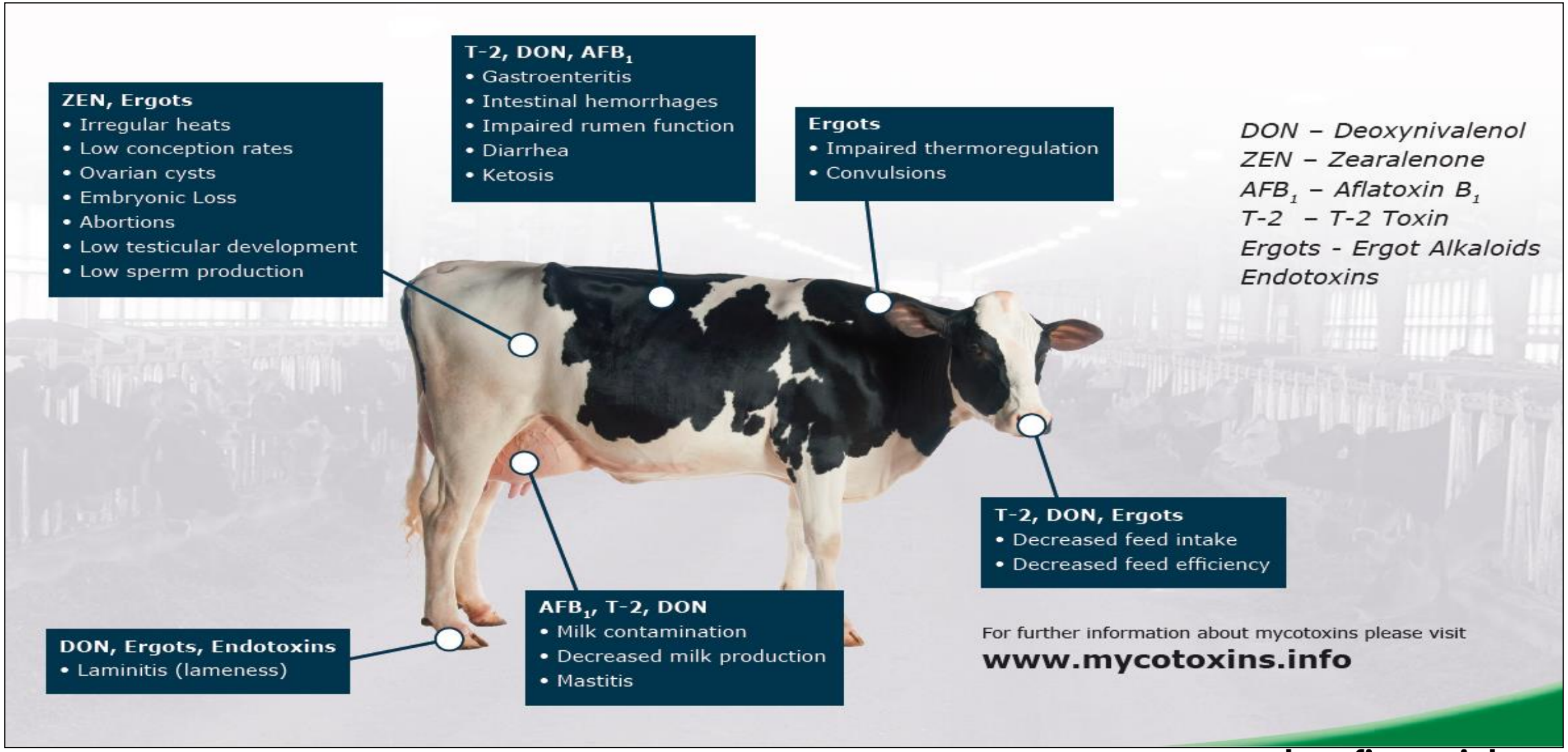
Effects of Mycotoxins



Are Mycotoxins detoxified by the ruminal microbes?

Mycotoxin	Degradation in the Rumen	Bypass to the Intestine
Aflatoxin	0 - 42 % More toxic Aflatoxicol *(Engel and Hagemeister, 1978)*	58 – 100 %
Zearalenone	50% α- and β-Zearalenol *(Gruber-Dorninger et al., 2021)*	50 % metabolites more estrogenic
Trichothecenes	15 % - 99 % DOM-1 *(Cote et al., 1986; Kiessling et al., 1984, Debevere, 2020)*	1 - 85 %
Ochratoxin A	90-100% (Mobashar et al, 2010)	0-10%
Fumonisin	No degradation (EFSA, 2018)	Unknown, no reported oral bioavailability
Enniantin B	1-25% (Debevere et al, 2020)	75%-99%

Mycotoxins are coming from the field and unproper storage

Initially 40% of material is rejected at the farm level

Previous crop
Inoculum

Hybride
Resistance

Harvest time
Cleanig &
Moisture

Wheater
Rain at flowering
Geographic location

Economic sustainability

Soil
Inoculum
Agro Techn.
Tilling

Fungiside
Protection
Triazoles

Storage
Adequate storage condition
Tem. C, H2O, cleanest

Jöhr (2010) presented at STDF/LNV/World Bank Workshop, Den Haag

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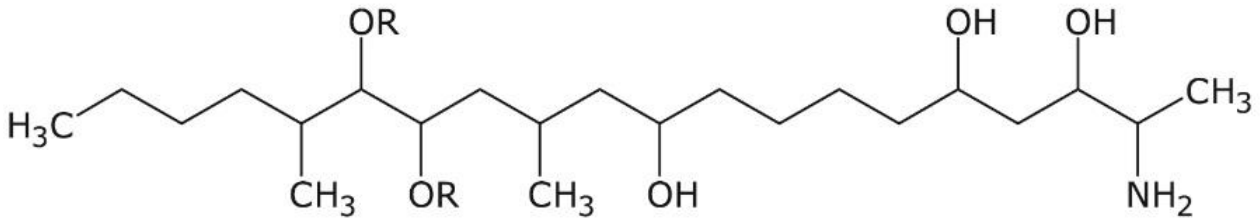
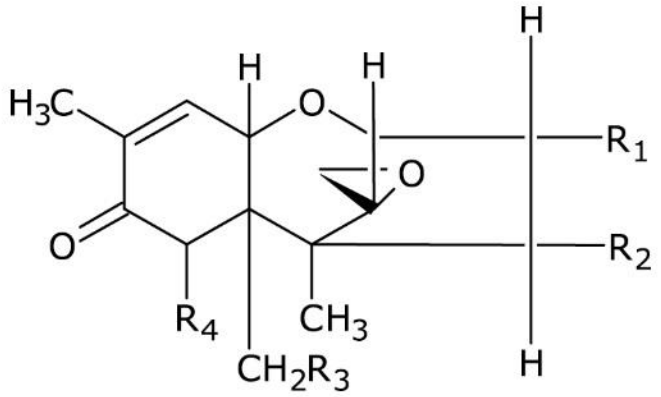
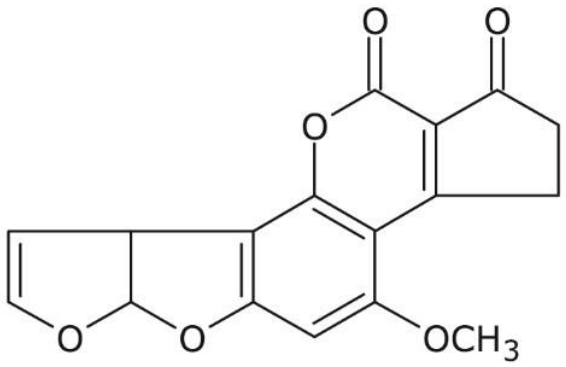
Mycotoxins require different deactivating strategies!



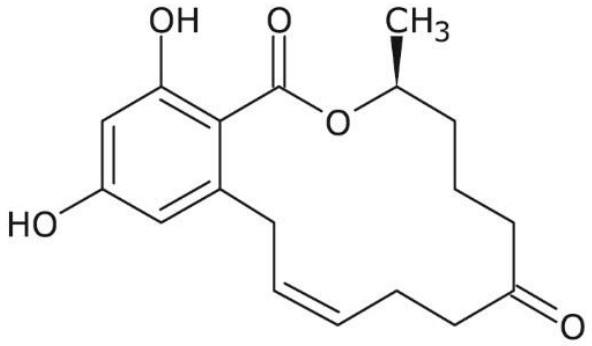
Fumonisins



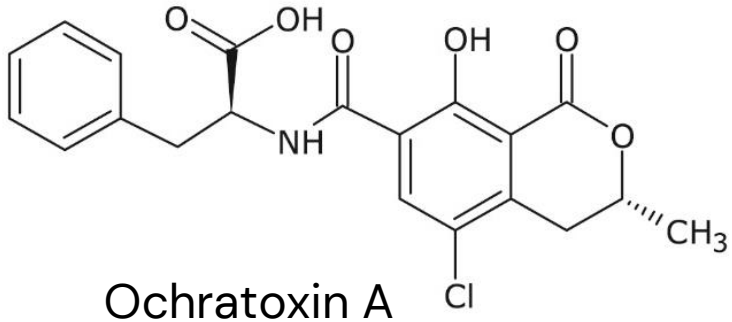
Trichothecenes



Aflatoxins



Zearalenone



Ochratoxin A

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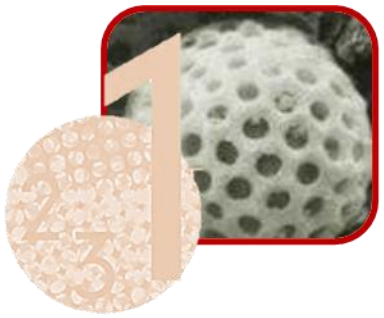
Mycofix® – Naturally Ahead in Mycotoxin Risk Management!



Adsorption

… for the elimination of toxins

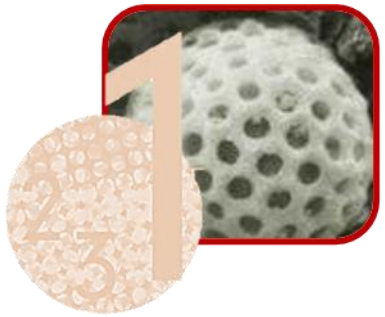
Biotransformation

… for the elimination of toxicity

Bioprotection

… for the elimination of toxic effects

Mycofix® – Naturally ahead in mycotoxin risk management!



Adsorption

… for the elimination of toxins

Afla, Ergots, OTA, Endotoxins

Biotransformation

… for the elimination of toxicity

ZEN, Trichothecenes, FUM

Bioprotection

… for the elimination of toxic effects

Liver protection and immune support

We bring progress to life

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