DSM World Mycotoxin Survey

The Global Threat
January – December 2022

ANIMAL NUTRITION AND HEALTH

ESSENTIAL PRODUCTS

PERFORMANCE SOLUTIONS + BIOMIN®
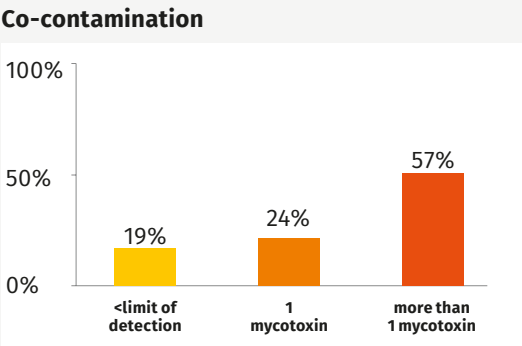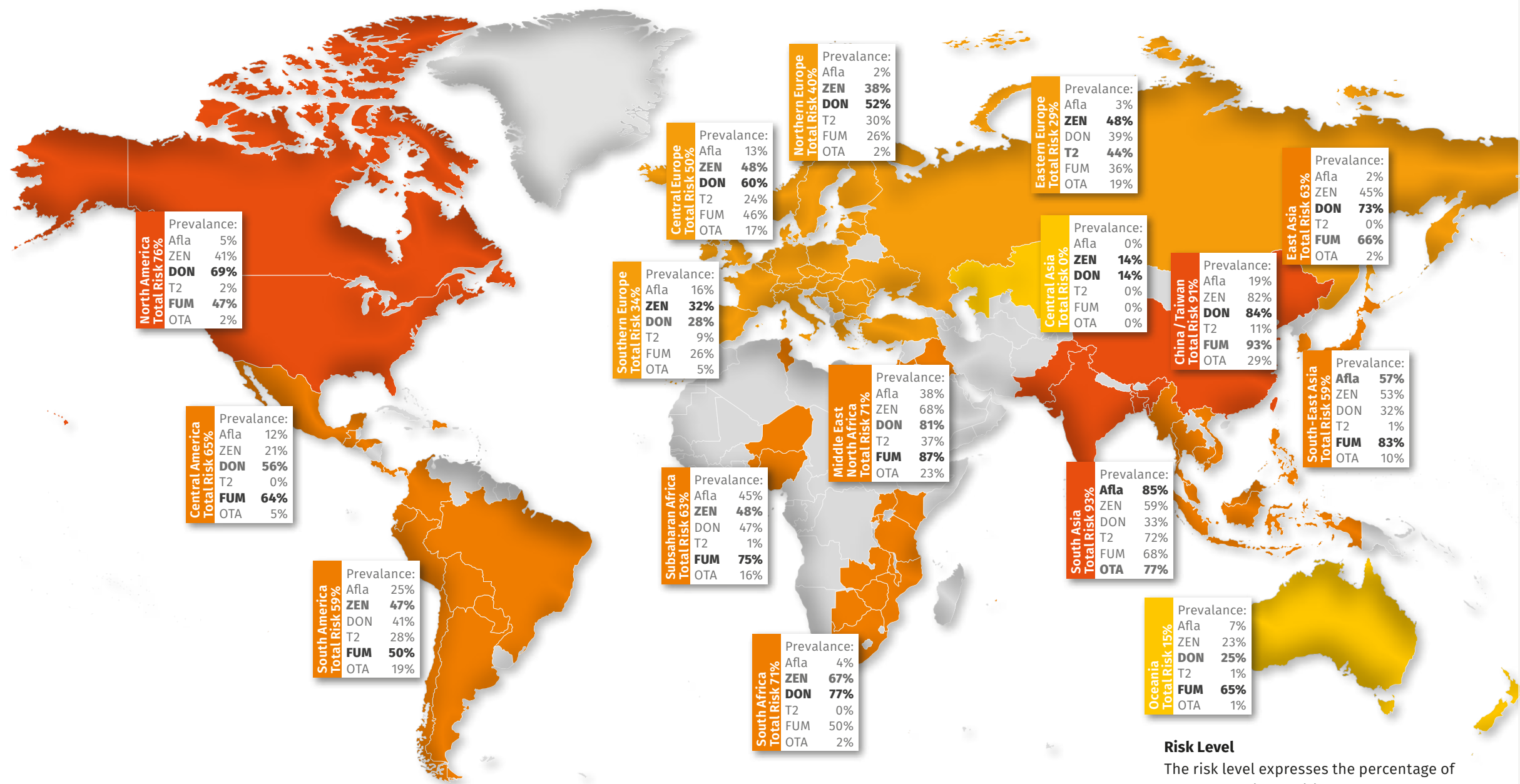
PRECISION SERVICES

DSM

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DSM World Mycotoxin Survey* 2022

* previously known as Biomin World Mycotoxin Survey

DSM BRIGHT SCIENCE. BRIGHTER LIVING.

World Overview

Figure 1. Global map of mycotoxin prevalence and risk in different regions.

North America
Total Risk 76%
Prevalance:
Afla	5%
ZEN	41%
DON	**69%**
T2	2%
FUM	**47%**
OTA	2%

Central America
Total Risk 65%
Prevalance:
Afla	12%
ZEN	21%
DON	**56%**
T2	0%
FUM	**64%**
OTA	5%

South America
Total Risk 59%
Prevalance:
Afla	25%
ZEN	**47%**
DON	41%
T2	28%
FUM	**50%**
OTA	19%

Central Europe
Total Risk 50%
Prevalance:
Afla	13%
ZEN	**48%**
DON	**60%**
T2	24%
FUM	46%
OTA	17%

Northern Europe
Total Risk 40%
Prevalance:
Afla	2%
ZEN	38%
DON	**52%**
T2	30%
FUM	26%
OTA	2%

Southern Europe
Total Risk 34%
Prevalance:
Afla	16%
ZEN	**32%**
DON	**28%**
T2	9%
FUM	26%
OTA	5%

Eastern Europe
Total Risk 29%
Prevalance:
Afla	3%
ZEN	**48%**
DON	39%
T2	**44%**
FUM	36%
OTA	19%

Central Asia
Total Risk 0%
Prevalance:
Afla	0%
ZEN	**14%**
DON	**14%**
T2	0%
FUM	0%
OTA	0%

East Asia
Total Risk 63%
Prevalance:
Afla	2%
ZEN	45%
DON	**73%**
T2	0%
FUM	**66%**
OTA	2%

China / Taiwan
Total Risk 91%
Prevalance:
Afla	19%
ZEN	82%
DON	**84%**
T2	11%
FUM	**93%**
OTA	29%

South-East Asia
Total Risk 59%
Prevalance:
Afla	**57%**
ZEN	53%
DON	32%
T2	1%
FUM	**83%**
OTA	10%

Middle East North Africa
Total Risk 71%
Prevalance:
Afla	38%
ZEN	68%
DON	**81%**
T2	37%
FUM	**87%**
OTA	23%

Subsaharan Africa
Total Risk 63%
Prevalance:
Afla	45%
ZEN	**48%**
DON	47%
T2	1%
FUM	**75%**
OTA	16%

South Asia
Total Risk 93%
Prevalance:
Afla	**85%**
ZEN	59%
DON	33%
T2	72%
FUM	68%
OTA	**77%**

South Africa
Total Risk 71%
Prevalance:
Afla	4%
ZEN	**67%**
DON	**77%**
T2	0%
FUM	50%
OTA	2%

Oceania
Total Risk 15%
Prevalance:
Afla	7%
ZEN	23%
DON	25%
T2	1%
FUM	**65%**
OTA	1%

Risk Level
The risk level expresses the percentage of samples testing positive for at least one mycotoxin above the threshold level in parts per billion (ppb).

Recommended risk threshold of major mycotoxins in ppb

Afla	ZEN	DON	T-2	FUM	OTA
2	50	150	50	500	10

Legend: 0 – 25% | 26 – 50% | 51 – 75% | 76 – 100% of samples above risk threshold | No samples tested

Moderate risk ←→ Extreme risk

Samples 27 297
Analyses 122 240
Countries 87

Co-contamination

| <limit of detection | 1 mycotoxin | more than 1 mycotoxin |
| 19% | 24% | 57% |

Number of mycotoxins per sample based on samples tested for 3 or more mycotoxins.

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Mycotoxin Trends

Starting already in 2004, the DSM Mycotoxin Survey is the longest running Mycotoxin Survey. This huge dataset allows us to look at variations in contamination levels of the mycotoxins over the years.

In the last 10 years contamination with the six main mycotoxins in all commodities (raw materials as well as finished feed) seems to be stable on a global perspective. Prevalence of the *Fusarium* mycotoxins DON, FUM, T-2 toxin and ZEN varies slightly between years but e.g. DON occurs throughout the years in >50% up to 74% of all samples. The yearly average of positives concentration levels show more variation with some peaks.

Global trends of Fusarium mycotoxins in all commodities (last 10 years)
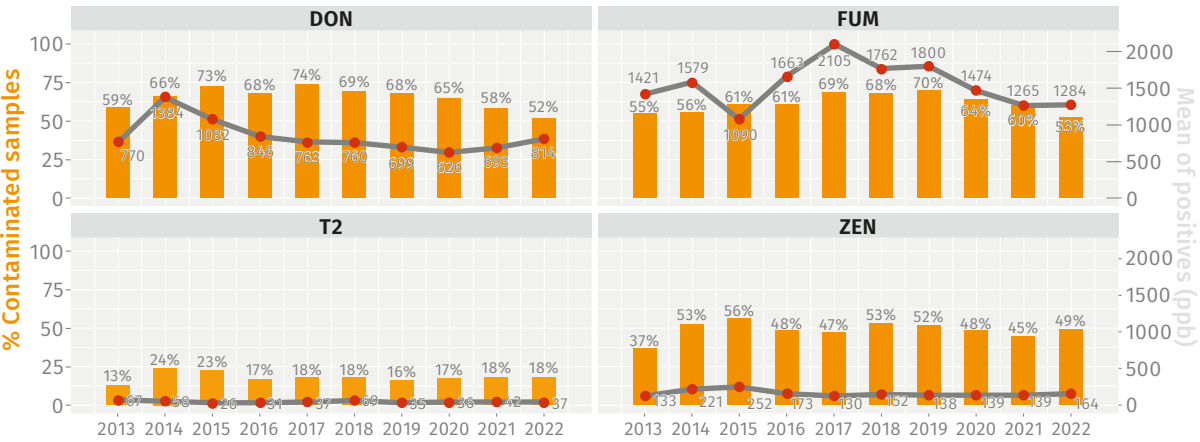

Global trends of Afla and OTA in all commodities (last 10 years)
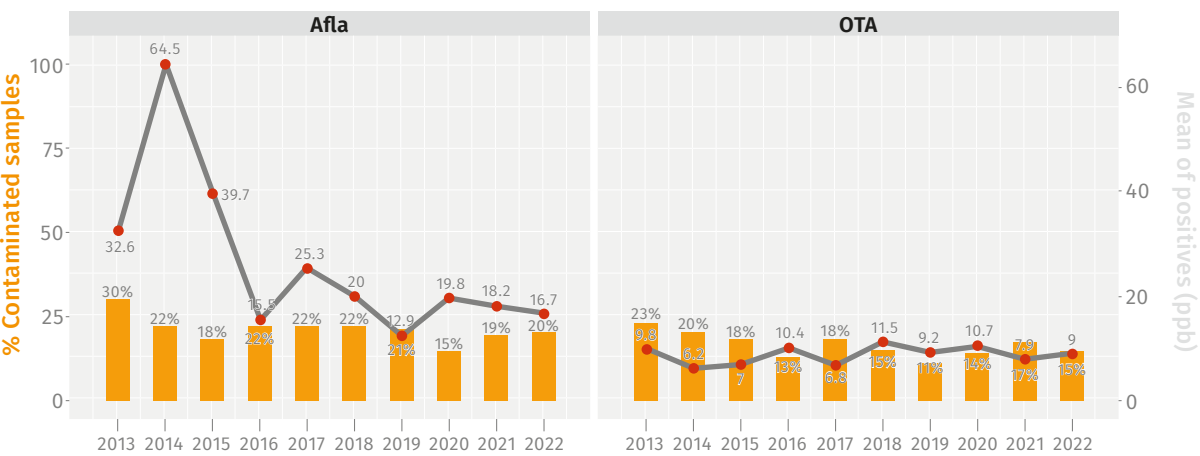
Prevalence of Aflatoxins and OTA seems to be as well quite stable. Aflatoxin concentrations vary more widely with peak values in 2014, 2017 and 2020.

While there is high variation when looking at different raw materials in specific regions and sub-regions, the global perspective shows the consistent presence of mycotoxins in animal feed and its ingredients.

Europe
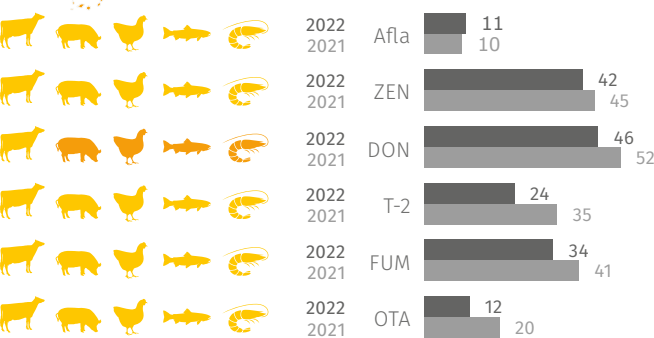
Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow=moderate to red=extreme see color code page 2)

% Contaminated samples January–December 2022 ▪ and January–December 2021 ▪

All samples

DON is most prevalent, followed by **ZEN** and **FUM**

DON poses the biggest risk to animal species

Corn

Average levels of **DON** and **ZEN** increased compared to 2021

	Total samples: 10 236	Afla	ZEN	DON	T-2	FUM	OTA
Total Samples	Number of samples tested	6 289	8 552	8 837	6303	6390	5 990
	% Contaminated samples	11%	42%	46%	24%	34%	12%
	Average of positive (ppb)	9	148	797	44	708	11
	Median of positive (ppb)	3	25	286	17	202	3
	Maximum (ppb)	477	178 269	445 956	2 014	38 481	414
Corn	Number of samples tested	783	1 133	1 152	746	978	727
	% Contaminated samples	11%	44%	60%	36%	51%	10%
	Average of positive (ppb)	30	210	986	92	1 480	31
	Median of positive (ppb)	6	43	527	36	467	4
	Maximum (ppb)	370	13 498	15 640	1 892	38 481	414
Cereals*	Number of samples tested	1 384	2 591	2 715	1 575	1 420	1 352
	% Contaminated samples	4%	26%	33%	24%	10%	6%
	Average of positive (ppb)	3	55	484	40	425	20
	Median of positive (ppb)	3	32	209	20	365	4
	Maximum (ppb)	14	2 145	21 200	1 069	2 028	361

*Cereals include: wheat grain, triticale, barley, rye, oats, rice grain, sorghum, millet.
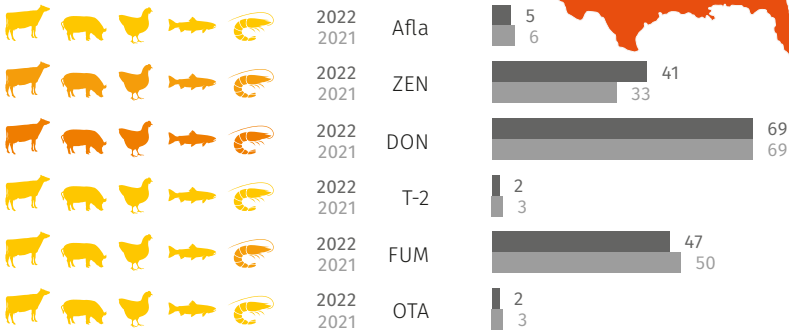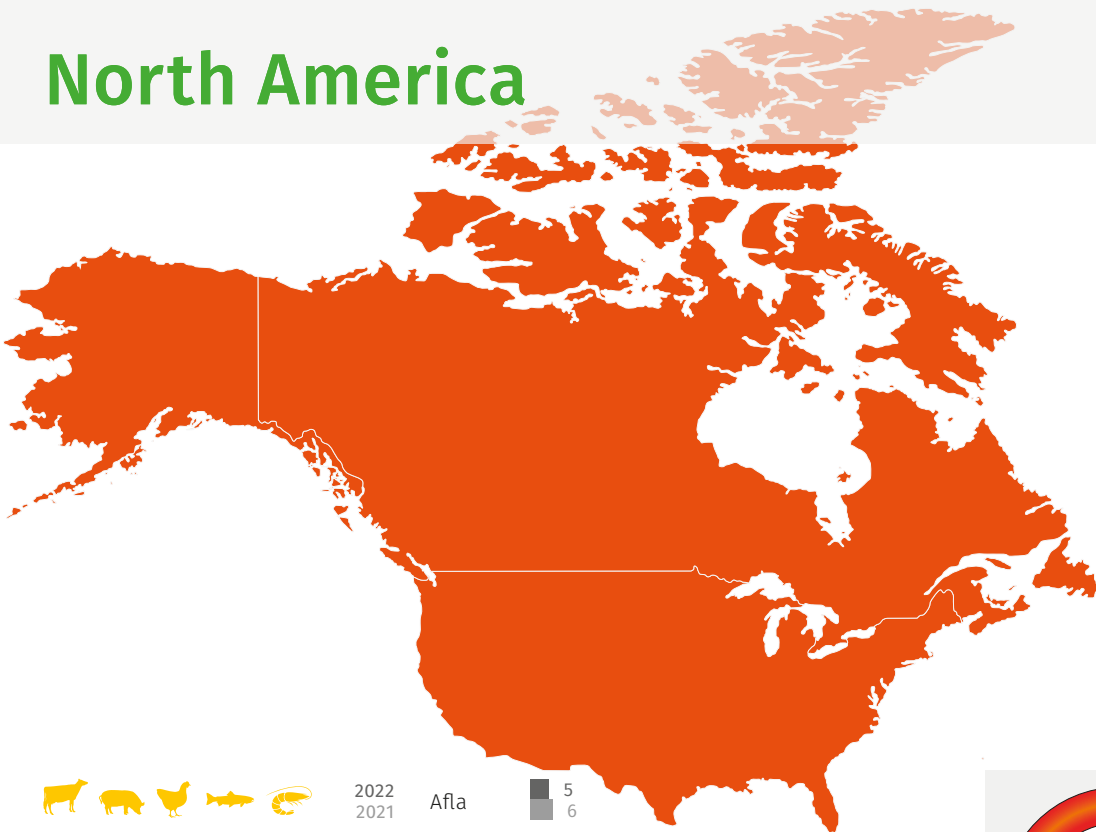
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North America

2022 / 2021		
Afla	2022	5
	2021	6
ZEN	2022	41
	2021	33
DON	2022	69
	2021	69
T-2	2022	2
	2021	3
FUM	2022	47
	2021	50
OTA	2022	2
	2021	3

Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow =moderate to red=extreme see color code page 2)

% Contaminated samples January–December 2022 ■ and January–December 2021 ■

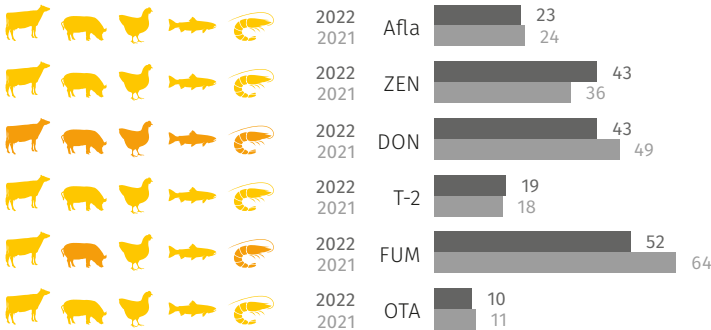|	Total samples: 1 576	Afla	ZEN	DON	T-2	FUM	OTA
Total Samples	Number of samples tested	1 566	1572	1 573	1 569	1 571	1 569
	% Contaminated samples	5%	41%	69%	2%	47%	2%
	Average of positive (ppb)	70	292	1 114	95	2 201	5
	Median of positive (ppb)	5	135	550	47	681	2
	Maximum (ppb)	3 414	9 437	17 673	550	65 467	75
Finished Feed	Number of samples tested	525	524	525	525	525	525
	% Contaminated samples	7%	41%	79%	1%	48%	3%
	Average of positive (ppb)	100	214	725	4	2 766	2
	Median of positive (ppb)	4	119	442	4	882	2
	Maximum (ppb)	3414	2 374	5 260	6	65 467	7
Corn	Number of samples tested	428	432	432	429	430	428
	% Contaminated samples	7%	35%	68%	2%	71%	1%
	Average of positive (ppb)	47	414	1 155	130	2 488	27
	Median of positive (ppb)	18	199	555	113	643	4
	Maximum (ppb)	602	9 437	17 673	550	45 785	75

Corn
Extreme maximum levels detected for **Afla, ZEN, DON** and **FUM**

Corn DDSG
Fusarium mycotoxins are highly prevalent, **94%** are co-contaminated with at least **2 mycotoxins.**

94%

South and Central America

| 2022 / 2021		
Afla	2022	23
	2021	24
ZEN	2022	43
	2021	36
DON	2022	43
	2021	49
T-2	2022	19
	2021	18
FUM	2022	52
	2021	64
OTA	2022	10
	2021	11

Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow=moderate to red=extreme see color code page 2)

% Contaminated samples January–December 2022 ■ and January–December 2021 ■

	Total samples: 10 138	Afla	ZEN	DON	T-2	FUM	OTA
Total Samples	Number of samples tested	9 004	8 187	7 932	4 150	8 240	1 981
	% Contaminated samples	23%	43%	43%	19%	52%	10%
	Average of positive (ppb)	5	94	587	31	1 255	4
	Median of positive (ppb)	2	51	417	22	690	3
	Maximum (ppb)	565	5 066	16 000	450	36 194	54
Corn	Number of samples tested	3 928	3 621	3 353	1 084	3 768	404
	% Contaminated samples	18%	32%	48%	9%	64%	14%
	Average of positive (ppb)	6	103	588	29	1 573	3
	Median of positive (ppb)	2	44	420	27	896	3
	Maximum (ppb)	565	3 513	16 000	197	22 610	23
Cereals*	Number of samples tested	237	203	214	139	214	93
	% Contaminated samples	16%	30%	49%	25%	19%	29%
	Average of positive (ppb)	5	235	852	42	381	10
	Median of positive (ppb)	2	45	424	30	280	8
	Maximum (ppb)	80	4 539	5 157	230	1 900	54

*Cereals include: wheat grain, barley, rye, oats, rice, sorghum, millet.

Cereals
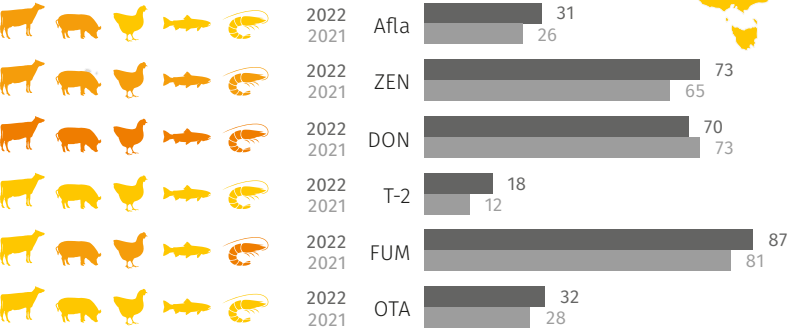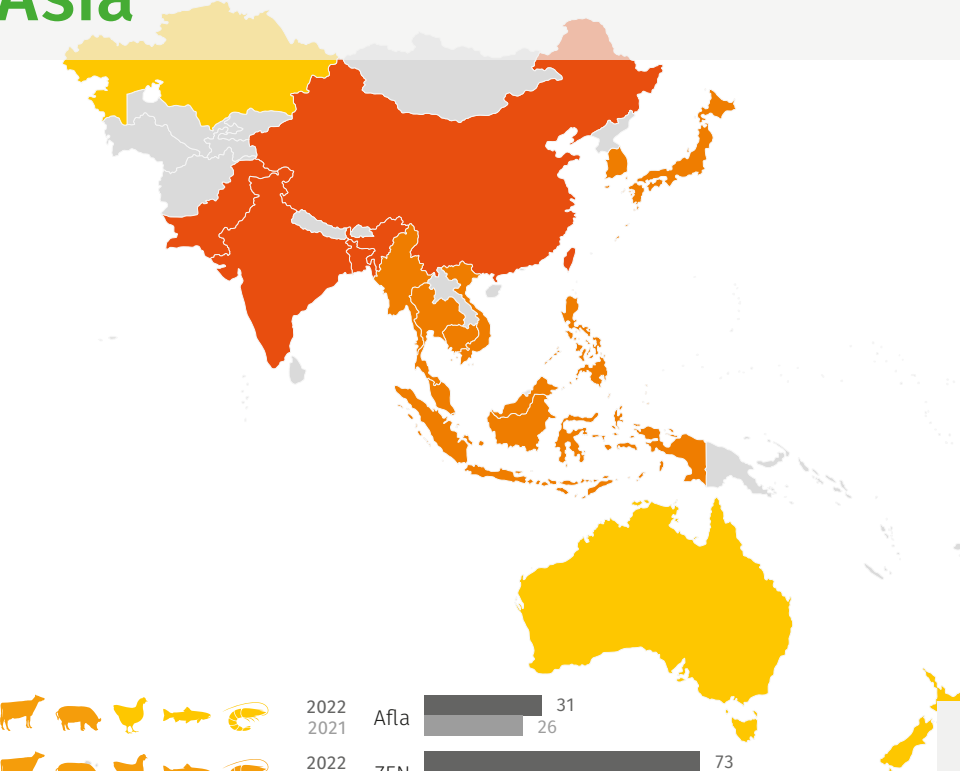**ZEN** levels increased to an average of 235 ppb and a maximum of 4 539 ppb.
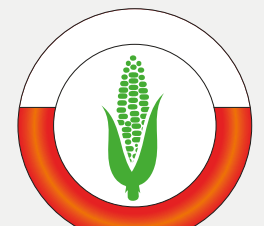
Corn
FUM is most prevalent in **64%** of samples with a maximum of 22 610 ppb.

64%

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Asia

	2022	2021
Afla	31	26
ZEN	73	65
DON	70	73
T-2	18	12
FUM	87	81
OTA	32	28

Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow=moderate to red=extreme see color code page 2)

% Contaminated samples January–December 2022 ■ and January–December 2021 ■

	Total samples: 3 945	Afla	ZEN	DON	T-2	FUM	OTA
Total Samples	Number of samples tested	3 941	3874	3 943	3 831	3 833	3 804
	% Contaminated samples	31%	73%	70%	18%	87%	32%
	Average of positive (ppb)	32	272	1 041	27	1 617	9
	Median of positive (ppb)	13	73	620	20	755	4
	Maximum (ppb)	2 194	24 333	20 600	374	40 363	403
Corn	Number of samples tested	983	982	985	981	981	956
	% Contaminated samples	27%	66%	78%	23%	95%	49%
	Average of positive (ppb)	44	243	1 237	18	2 828	4
	Median of positive (ppb)	20	82	940	14	1 920	3
	Maximum (ppb)	478	8 305	17 743	124	37 850	72
Cereals*	Number of samples tested	330	316	330	316	317	316
	% Contaminated samples	6%	61%	45%	16%	72%	54%
	Average of positive (ppb)	8	69	673	24	549	5
	Median of positive (ppb)	6	50	350	21	530	4
	Maximum (ppb)	26	702	3 620	73	10 998	63

*Cereals include: wheat grain, barley, rye, oats, rice grain, sorghum, millet.

Finished Feed
Afla is detected in **42%** of finished feed samples with a maximum of 243 ppb

42%

Corn
High prevalence of **FUM (95%)** with an average of 2 828 ppb and 37 850 ppb maximum

95%

Africa

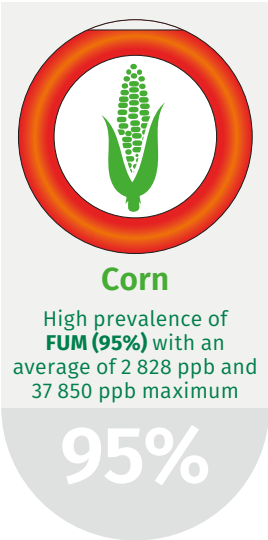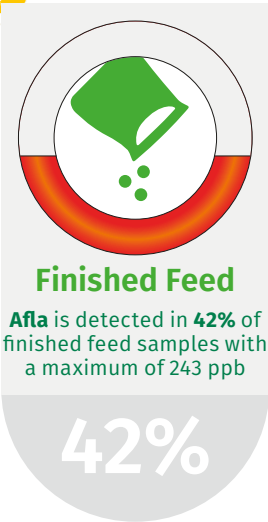|	2022	2021
Afla	18	7
ZEN	61	44
DON	67	80
T-2	1	0
FUM	59	50
OTA	7	5

Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow=moderate to red=extreme see color code page 2)
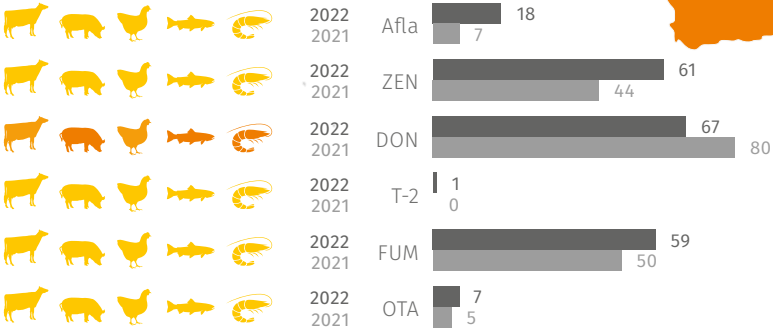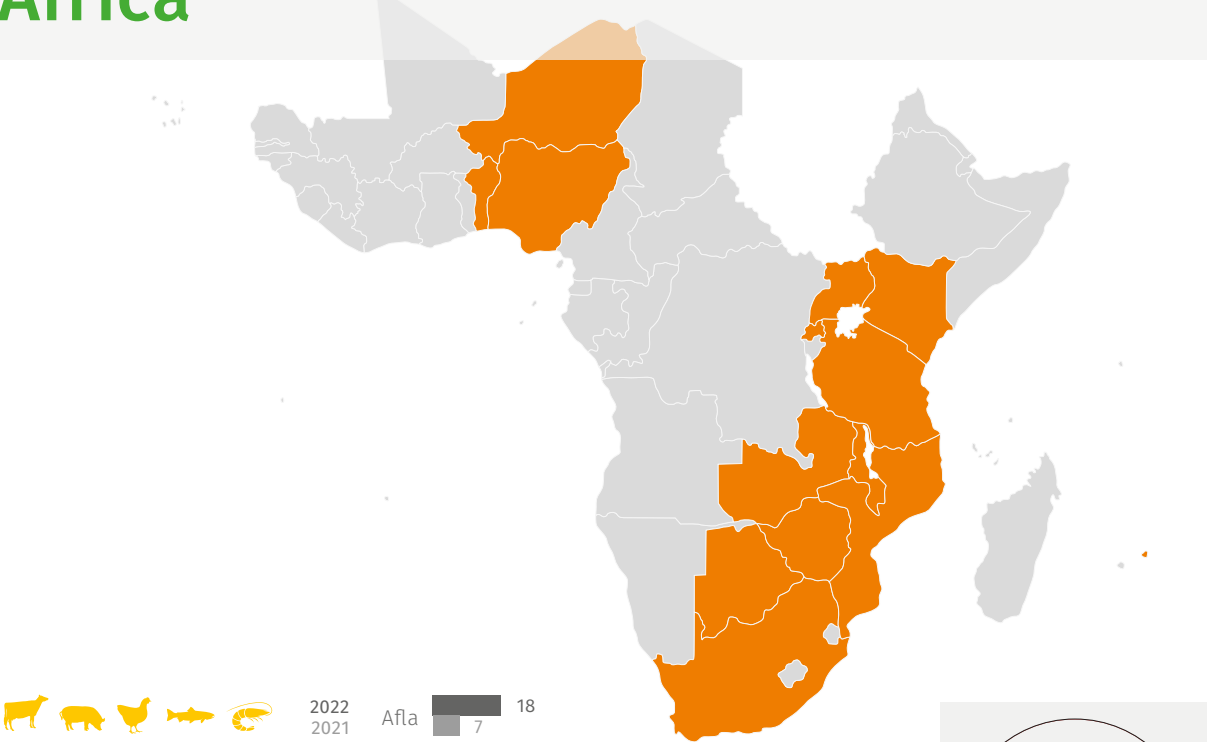
% Contaminated samples January–December 2022 ■ and January–December 2021 ■

	Total samples: 1 305	Afla	ZEN	DON	T-2	FUM	OTA
Total Samples	Number of samples tested	1 210	1 171	1 171	1 171	1 266	1 171
	% Contaminated samples	18%	61%	67%	1%	59%	7%
	Average of positive (ppb)	50	53	696	18	785	6
	Median of positive (ppb)	6	20	378	11	243	4
	Maximum (ppb)	1 324	1 515	4 818	65	34 995	37
Corn	Number of samples tested	467	449	449	449	544	449
	% Contaminated samples	6%	64%	79%	0%	64%	2%
	Average of positive (ppb)	45	48	798	24	1 070	3
	Median of positive (ppb)	22	20	500	24	266	2
	Maximum (ppb)	247	739	4 576	24	34 995	5
Finished Feed	Number of samples tested	337	337	337	337	337	337
	% Contaminated samples	32%	72%	82%	1%	87%	9%
	Average of positive (ppb)	31	43	414	8	607	4
	Median of positive (ppb)	4	18	258	3	244	4
	Maximum (ppb)	521	1 147	4 818	24	10 660	12

All samples
DON (67%) is the main risk, **ZEN** and **Afla** abundance increased

67%

Finished feed
Shows >30% abundance of **Afla** (average of positives 31 ppb)

>30%

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Middle East & North Africa

Bar chart (% Contaminated samples January–December 2022 and January–December 2021):

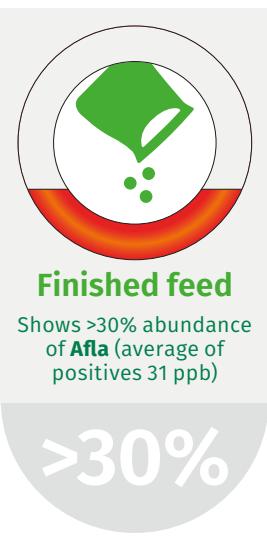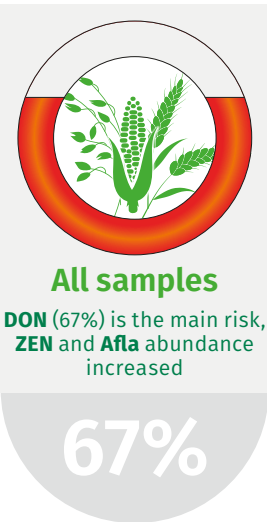| Mycotoxin	2022	2021
Afla	38	24
ZEN	68	60
DON	81	53
T-2	37	14
FUM	87	83
OTA	23	21

Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow =moderate to red=extreme see color code page 2)
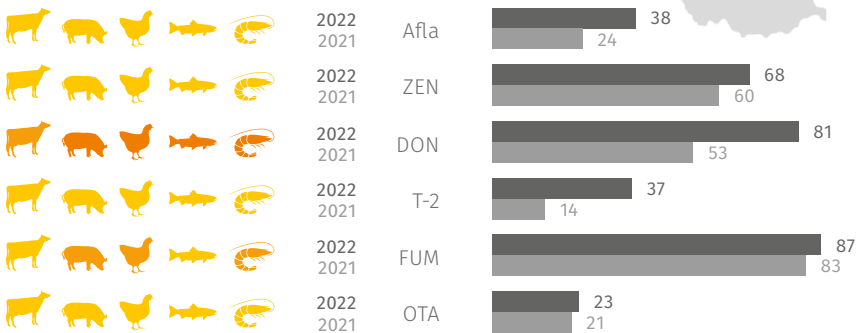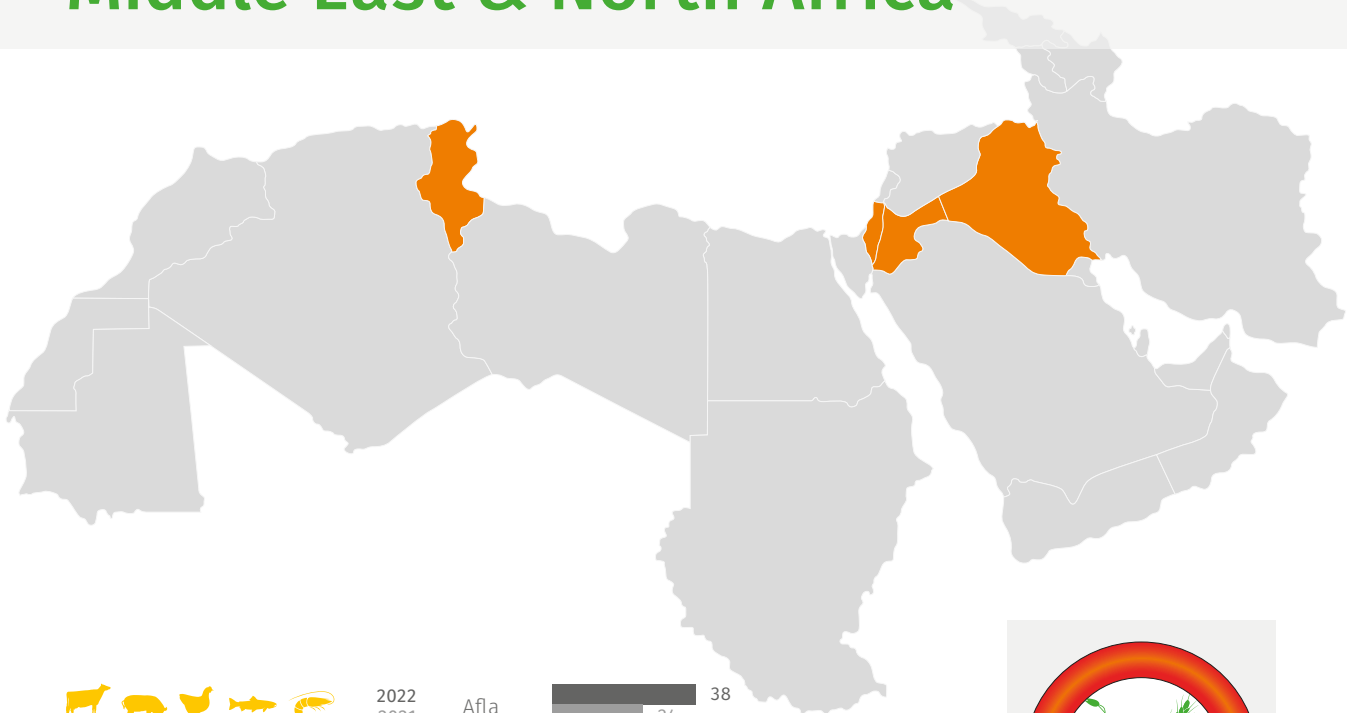
% Contaminated samples January–December 2022 ■ and January–December 2021 ■

All samples

Fusarium mycotoxins are highly abundant: prevalence of ZEN, FUM, especially DON and T-2 increased

Corn kernel

100% of corn kernel samples are co-contaminated with at least **2 mycotoxins**

	Total samples: 97	Afla	ZEN	DON	T-2	FUM	OTA
Total Samples	Number of samples tested	97	94	97	97	97	97
	% Contaminated samples	38%	68%	81%	37%	87%	23%
	Average of positive (ppb)	18	151	636	18	785	5
	Median of positive (ppb)	3	38	322	18	380	3
	Maximum (ppb)	161	4 901	4 389	36	5 235	13
Corn	Number of samples tested	11	11	11	11	11	11
	% Contaminated samples	45%	73%	91%	64%	100%	9%
	Average of positive (ppb)	1	36	494	25	784	1
	Median of positive (ppb)	1	39	494	22	268	1
	Maximum (ppb)	3	63	868	36	2 348	1
Finished Feed	Number of samples tested	49	48	49	49	49	49
	% Contaminated samples	39%	75%	100%	43%	98%	22%
	Average of positive (ppb)	31	200	387	16	584	4
	Median of positive (ppb)	12	38	212	16	250	3
	Maximum (ppb)	161	4 901	2 580	27	2 486	12
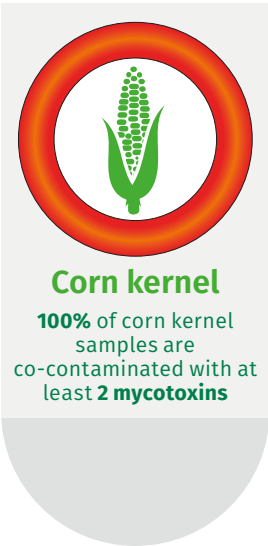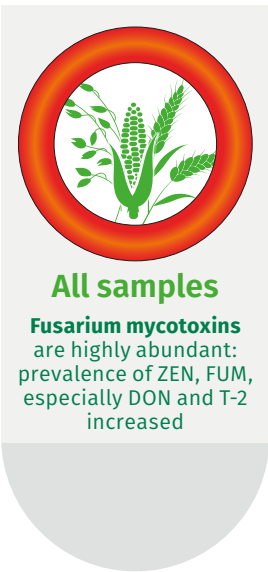
Focus: major grain & soy producing countries

Corn

Country		Afla	ZEN	DON	T2	FUM	OTA
USA	Number of samples	390	390	390	390	390	390
	% Contaminated samples	7%	35%	66%	2%	72%	1%
	Average of positives (ppb)	50	451	1 198	83	2 627	4
	Median of positives (ppb)	18	215	543	102	651	4
	Maximum (ppb)	602	9 437	17 673	188	45 785	4
Argentina	Number of samples	1 722	1 611	907	414	1 314	110
	% Contaminated samples	33%	36%	59%	19%	73%	41%
	Average of positives (ppb)	3	61	724	26	2 166	3
	Median of positives (ppb)	2	27	450	27	1 410	3
	Maximum (ppb)	77	1 324	16 000	84	22 610	23
Brazil	Number of samples	1 814	1 616	2 052	277	2 060	24
	% Contaminated samples	6%	33%	41%	3%	53%	0%
	Average of positives (ppb)	12	134	539	80	1 132	
	Median of positives (ppb)	6	76	430	61	693	
	Maximum (ppb)	191	1 200	4 420	197	13 790	0

Wheat

Country		Afla	ZEN	DON	T2	FUM	OTA
Russia	Number of samples	186	186	186	186	186	186
	% Contaminated samples	0%	15%	35%	19%	1%	6%
	Average of positives (ppb)		22	513	16	22	35
	Median of positives (ppb)		4	79	7	22	22
	Maximum (ppb)	0	160	5 097	90	22	119
USA	Number of samples	18	18	18	17	18	18
	% Contaminated samples	0%	6%	94%	0%	0%	50%
	Average of positives (ppb)		65	564			4
	Median of positives (ppb)		65	553			2
	Maximum (ppb)	0	65	1 330	0	0	16
France	Number of samples	149	233	233	149	149	149
	% Contaminated samples	0%	30%	56%	11%	2%	10%
	Average of positives (ppb)		47	278	4	18	4
	Median of positives (ppb)		34	71	3	18	3
	Maximum (ppb)	0	383	3 460	10	23	19

Soybean

Country		Afla	ZEN	DON	T2	FUM	OTA
Argentinia	Number of samples	1 117	1 239	519	759	301	22
	% Contaminated samples	73%	90%	39%	67%	7%	9%
	Average of positives (ppb)	3	53	552	30	275	3
	Median of positives (ppb)	2	50	430	19	260	3
	Maximum (ppb)	32	1 000	1 530	179	1 150	4
Brazil	Number of samples	625	636	698	88	708	12
	% Contaminated samples	4%	45%	16%	17%	7%	0%
	Average of positives (ppb)	5	71	590	29	702	
	Median of positives (ppb)	5	38	555	29	370	
	Maximum (ppb)	14	1 350	1 180	54	13 224	0
USA	Number of samples	32	35	35	35	35	35
	% Contaminated samples	9%	26%	17%	11%	34%	9%
	Average of positives (ppb)	30	37	293	33	214	1
	Median of positives (ppb)	1	17	305	25	96	1
	Maximum (ppb)	90	213	740	65	1 058	2

DSM World Mycotoxin Survey 2022

Multiple Mycotoxin Overview

Spectrum 380® and Spectrum Top®50

Only analyzing for single mycotoxins can lead to underestimation of the detrimental effects of mycotoxins on animal health and performance. Our long-term monitoring of mycotoxins in different commodities shows that co-occurrence of mycotoxins is the rule and not the exception. Here we need support of state-of the art analytical methods based on LC-MS/MS. These allow to detect multiple mycotoxins in one run. The high sensitivity of the method is important, as already moderate levels of mycotoxins can have a detrimental effect. This is especially true in case of co-contamination.

Spectrum 380®:

The most advanced and comprehensive mycotoxin analysis available

It detects > 800 different mycotoxins (including masked and modified forms and emerging mycotoxins), fungal metabolites as well as plant and bacterial toxins and metabolites.

This is not a routine analysis but it is done in special cases and/or also of course as part of research of future objectives. Spectrum 380® is developed and conducted by the world's leading independent mycotoxin research lab at the Department of Agrobiotechnology (IFA-Tulln) at the University of Natural Resources and Life Sciences Vienna and offered through cooperation with Performance Solutions plus Biomin.

Spectrum Top®50:

The most comprehensive mycotoxin analysis commercially available

It detects > 50 different mycotoxins (including masked and modified forms), emerging mycotoxins and fungal metabolites.

The Spectrum Top® 50 method was developed by scientists of Romer Labs, a leading global supplier of diagnostic solutions for food and feed safety.

Multiple Mycotoxin Overview: Spectrum 380®

Overview of:
- the most frequently found mycotoxins, their masked and modified forms
- emerging mycotoxins
- other fungal metabolites
- plants and bacterial toxins and metabolites in all samples analyzed

Multiple mycotoxin occurrence

Spectrum 380® results January to December 2022: the most comprehensive mycotoxin analysis available

Proportion of samples [%] — Metabolites in samples:
- <10: 2%
- 10-19: 14%
- 20-29: 17%
- 30-39: 18%
- 40-49: 17%
- 50-59: 16%
- >=60: 16%

40 average number of Mycotoxins and Metabolites per sample

9,6 out of **10** samples contaminated with *Fusarium* toxins

98% Contained **10** or more mycotoxins and metabolites

Total: 850 samples tested from 39 countries; 425 000 points of analysis

Mycotoxins & metabolites

Metabolite	Prevalence	Average	Maximum
cyclo(L-Pro-L-Tyr)	86%	784	19990
Tryptophol	83%	996	53620
cyclo(L-Pro-L-Val)	77%	1682	22198
Abscisic acid	76%	223	8665
Enniatin B	71%	44	1008
Beauvericin	71%	28	1324
Aurofusarin	70%	268	9189
Infectopyron	68%	3404	136200
Deoxynivalenol	66%	433	6348
Culmorin	66%	554	17210
Moniliformin	66%	69	7066
Brevianamid F	64%	65	861
Fellutanine A	64%	87	1690
Enniatin B1	64%	28	482
Equisetin	62%	39	1399
Altersetin	62%	62	1846
Flavoglaucin	57%	126	29569
Siccanol	56%	1423	27481
Rugulusovin	56%	123	2310
Emodin	54%	36	1668
Tenuazonic acid	54%	316	11512
Asperglaucide	54%	83	2913
Asperphenamate	53%	59	6471
Bikaverin	51%	40	879
Zearalenone	50%	57	1233
Enniatin A1	50%	12	219
15-Hydroxyculmorin	50%	421	7415

Positive Samples [%] for metabolites present in 50%/more than 50% of samples (orange bars indicate regulated or guideline mycotoxins; red bar indicates a masked mycotoxin). Cut off for all metabolites 1 ppb (except for aflatoxins 0.5 ppb). Average of positive samples and maximum levels are reported in ppb.
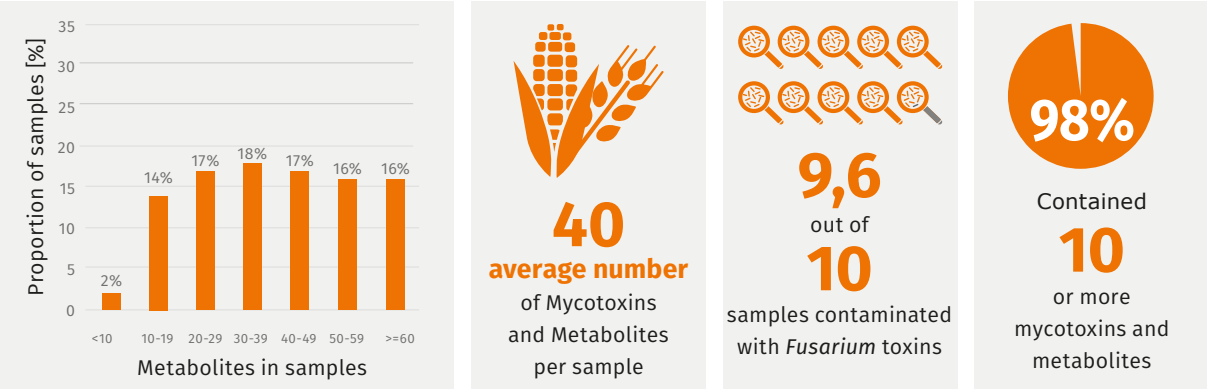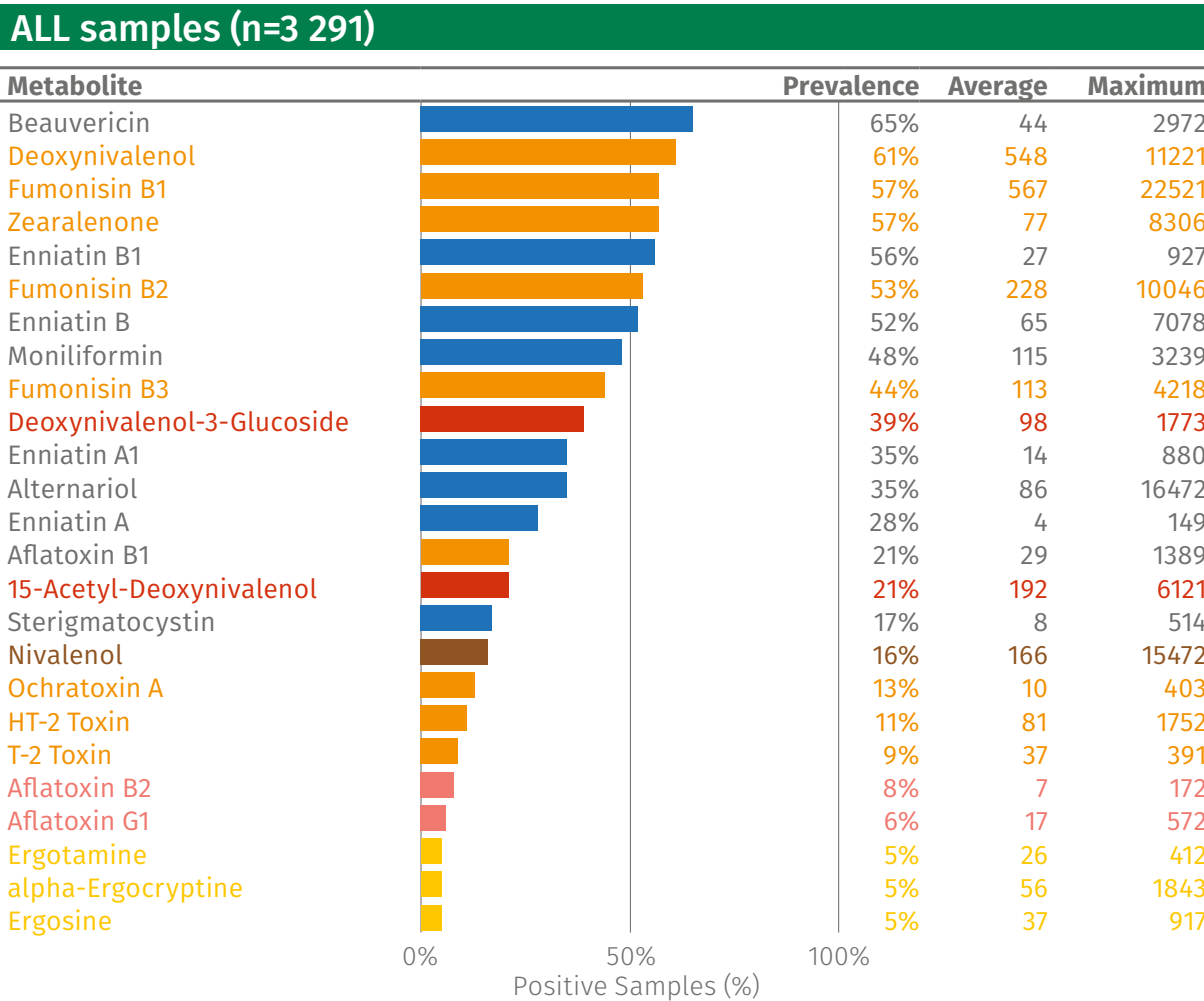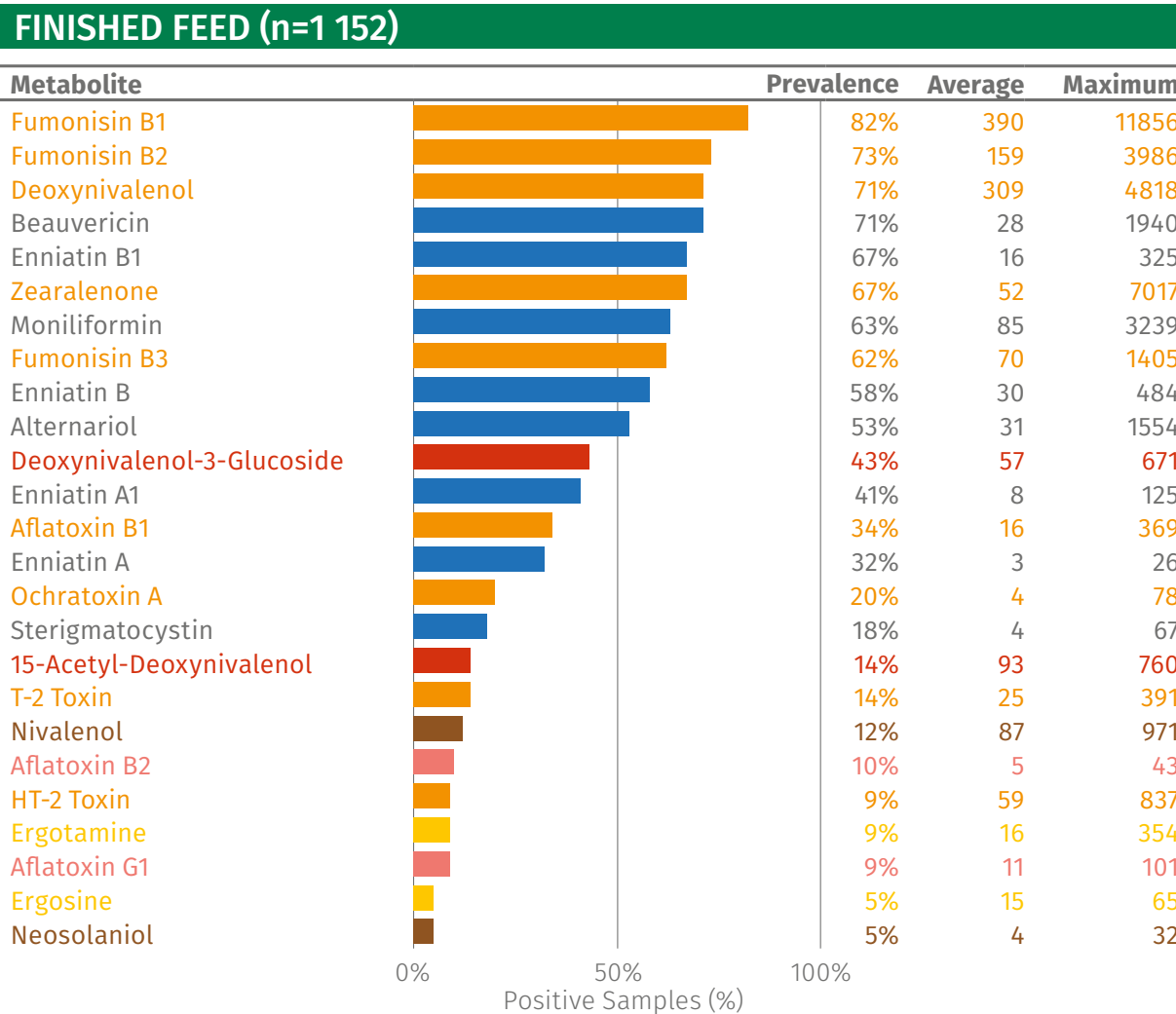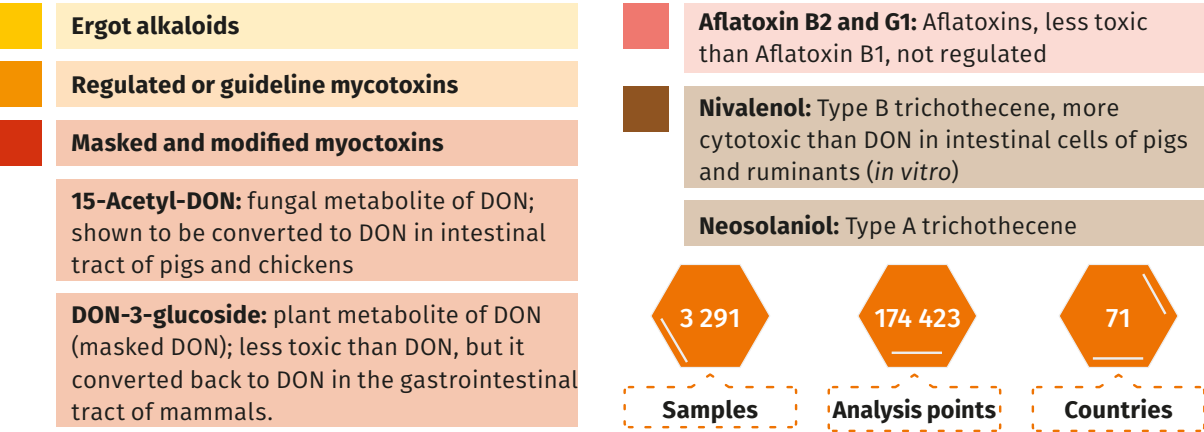
DSM World Mycotoxin Survey 2022
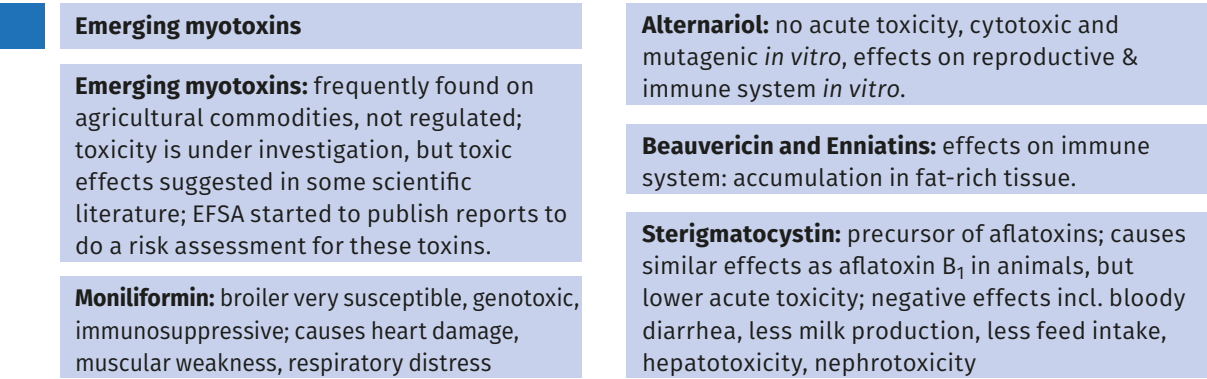
Multiple Mycotoxin Overview: Spectrum Top®50

Overview of the most frequently found mycotoxins, their masked and modified forms as well as emerging mycotoxins in all samples and finished feed

ALL samples (n=3 291)

Metabolite	Prevalence	Average	Maximum
Beauvericin	65%	44	2972
Deoxynivalenol	61%	548	11221
Fumonisin B1	57%	567	22521
Zearalenone	57%	77	8306
Enniatin B1	56%	27	927
Fumonisin B2	53%	228	10046
Enniatin B	52%	65	7078
Moniliformin	48%	115	3239
Fumonisin B3	44%	113	4218
Deoxynivalenol-3-Glucoside	39%	98	1773
Enniatin A1	35%	14	880
Alternariol	35%	86	16472
Enniatin A	28%	4	149
Aflatoxin B1	21%	29	1389
15-Acetyl-Deoxynivalenol	21%	192	6121
Sterigmatocystin	17%	8	514
Nivalenol	16%	166	15472
Ochratoxin A	13%	10	403
HT-2 Toxin	11%	81	1752
T-2 Toxin	9%	37	391
Aflatoxin B2	8%	7	172
Aflatoxin G1	6%	17	572
Ergotamine	5%	26	412
alpha-Ergocryptine	5%	56	1843
Ergosine	5%	37	917

Positive Samples (%)

Top25 metabolites are presented according to their prevalence. Cut off for all metabolites 1 ppb (except for aflatoxins 0.5 ppb). Average of positive samples and maximum levels found are reported in ppb.

Ergot alkaloids

Regulated or guideline mycotoxins

Masked and modified myoctoxins

15-Acetyl-DON: fungal metabolite of DON; shown to be converted to DON in intestinal tract of pigs and chickens

DON-3-glucoside: plant metabolite of DON (masked DON); less toxic than DON, but it converted back to DON in the gastrointestinal tract of mammals.

Aflatoxin B2 and G1: Aflatoxins, less toxic than Aflatoxin B1, not regulated

Nivalenol: Type B trichothecene, more cytotoxic than DON in intestinal cells of pigs and ruminants (in vitro)

Neosolaniol: Type A trichothecene

3 291 — Samples

174 423 — Analysis points

71 — Countries

FINISHED FEED (n=1 152)

Metabolite	Prevalence	Average	Maximum
Fumonisin B1	82%	390	11856
Fumonisin B2	73%	159	3986
Deoxynivalenol	71%	309	4818
Beauvericin	71%	28	1940
Enniatin B1	67%	16	325
Zearalenone	67%	52	7017
Moniliformin	63%	85	3239
Fumonisin B3	62%	70	1405
Enniatin B	58%	30	484
Alternariol	53%	31	1554
Deoxynivalenol-3-Glucoside	43%	57	671
Enniatin A1	41%	8	125
Aflatoxin B1	34%	16	369
Enniatin A	32%	3	26
Ochratoxin A	20%	4	78
Sterigmatocystin	18%	4	67
15-Acetyl-Deoxynivalenol	14%	93	760
T-2 Toxin	14%	25	391
Nivalenol	12%	87	971
Aflatoxin B2	10%	5	43
HT-2 Toxin	9%	59	837
Ergotamine	9%	16	354
Aflatoxin G1	9%	11	101
Ergosine	5%	15	65
Neosolaniol	5%	4	32

Positive Samples (%)

Top25 metabolites are presented according to their prevalence. Cut off for all metabolites 1 ppb (except for aflatoxins 0.5 ppb). Average of positive samples and maximum levels found are reported in ppb.

Emerging myotoxins

Emerging myotoxins: frequently found on agricultural commodities, not regulated; toxicity is under investigation, but toxic effects suggested in some scientific literature; EFSA started to publish reports to do a risk assessment for these toxins.

Moniliformin: broiler very susceptible, genotoxic, immunosuppressive; causes heart damage, muscular weakness, respiratory distress

Alternariol: no acute toxicity, cytotoxic and mutagenic in vitro, effects on reproductive & immune system in vitro.

Beauvericin and Enniatins: effects on immune system: accumulation in fat-rich tissue.

Sterigmatocystin: precursor of aflatoxins; causes similar effects as aflatoxin B_1 in animals, but lower acute toxicity; negative effects incl. bloody diarrhea, less milk production, less feed intake, hepatotoxicity, nephrotoxicity

Mycofix®

Deactivate mycotoxins
Activate performance

Powered by science to actively defend against multiple mycotoxins*

With 3 combined strategies

ADSORPTION

BIOTRANSFORMATION

BIOPROTECTION

*Authorized by EU Regulations No 1060/2013, 1016/2013, 1115/2014, 2017/913, 2017/930, 2018/1568 and 2021/363 for the reduction of contamination with fumonisins, aflatoxins and trichothecenes.

If not us, who? If not now, when?
WE MAKE IT POSSIBLE

MYCOTOXIN RISK MANAGEMENT

ANIMAL NUTRITION AND HEALTH

ESSENTIAL PRODUCTS

PERFORMANCE SOLUTIONS + BIOMIN®

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