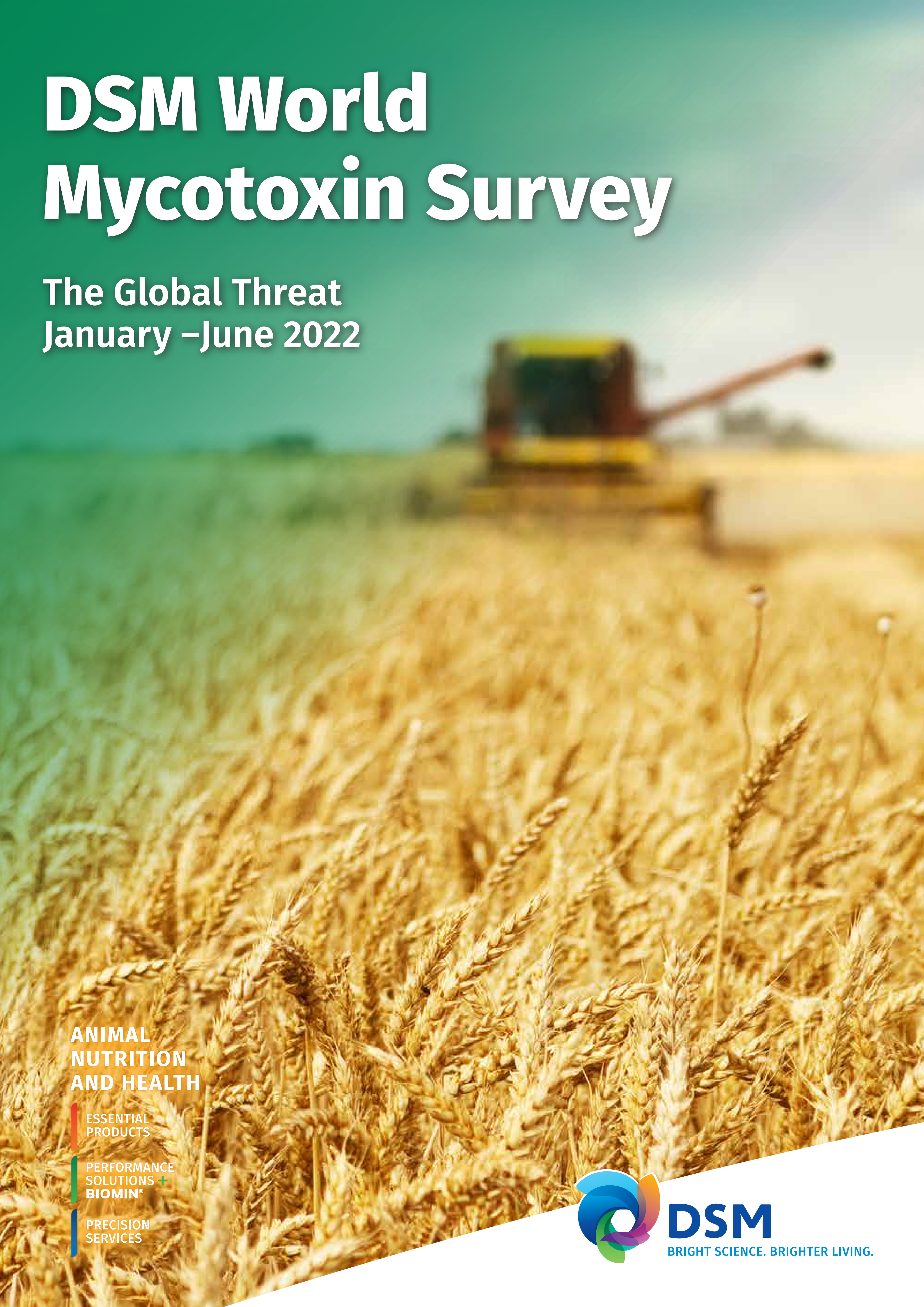

DSM World Mycotoxin Survey

The Global Threat
January –June 2022

ANIMAL NUTRITION AND HEALTH

ESSENTIAL PRODUCTS

PERFORMANCE SOLUTIONS + BIOMIN®

PRECISION SERVICES

DSM

BRIGHT SCIENCE. BRIGHTER LIVING.

DSM World Mycotoxin Survey

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World Overview

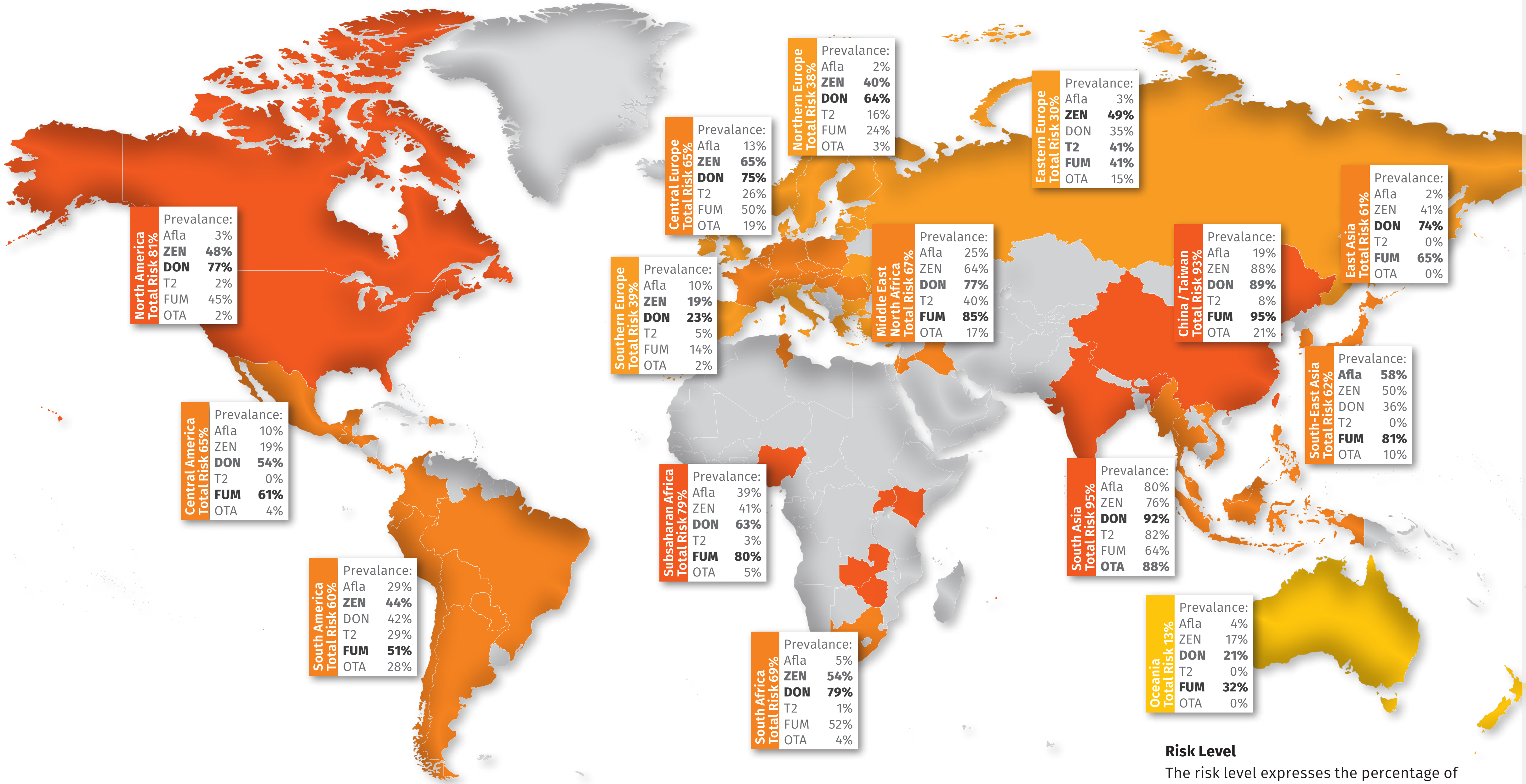


Figure 1. *Global map of mycotoxin prevalence and risk in different regions.*

0 – 25% | 26 – 50% | 51 – 75% | 76 – 100% | No samples tested

of samples above risk threshold

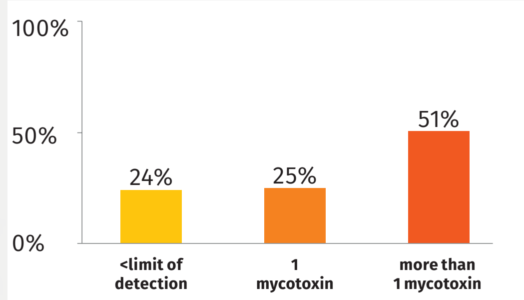
Moderate risk ⟷ Extreme risk

12 551 **Samples**

60 216 **Analyses**

74 **Countries**

Co-contamination



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

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

DISCLAIMER

DSM and the authors had no influence on the sampling process of the investigated samples. Therefore, the contamination levels found in the samples do not necessarily reflect the actual contamination level of these regions/commodities. However, the samples provide more insight into the range and levels of mycotoxins which can be found in diverse commodities of various regions.

Mycofix® is not available in the US and Canada.

ACKNOWLEDGEMENTS

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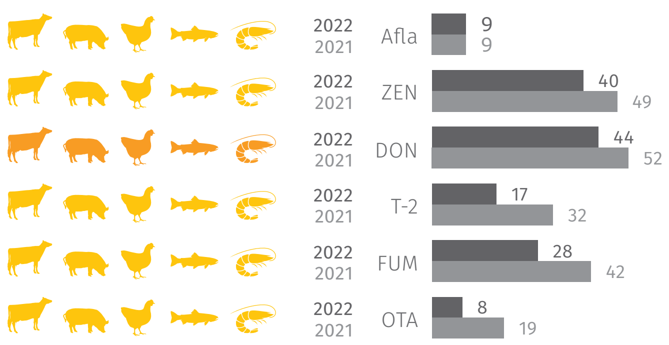
DSM World Mycotoxin Survey

The Global Threat – January to June 2022

Europe

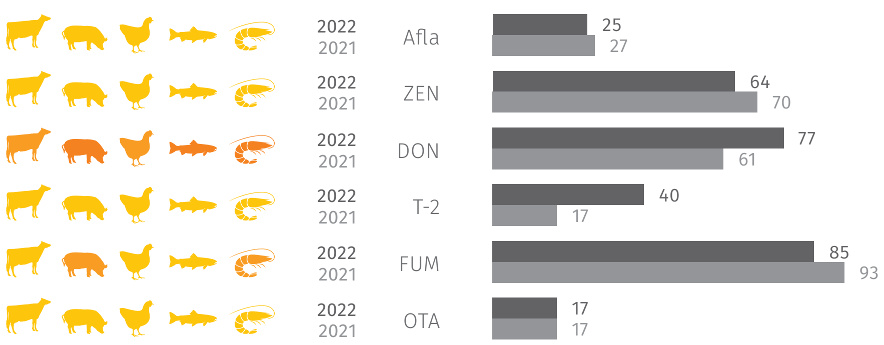


Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow=moderate to red=extreme see color code page 2)

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

Total samples: 4 101	Afla	ZEN	DON	T-2	FUM	OTA
Number of samples tested	3 416	3 988	4072	3 448	3 412	3 425
% Contaminated samples	9%	40%	44%	17%	28%	8%
Average of positive (ppb)	7	152	781	47	706	46
Median of positive (ppb)	3	26	348	18	121	3
Maximum (ppb)	161	178 269	445 956	1 367	32 363	72 652

Middle East & North Africa

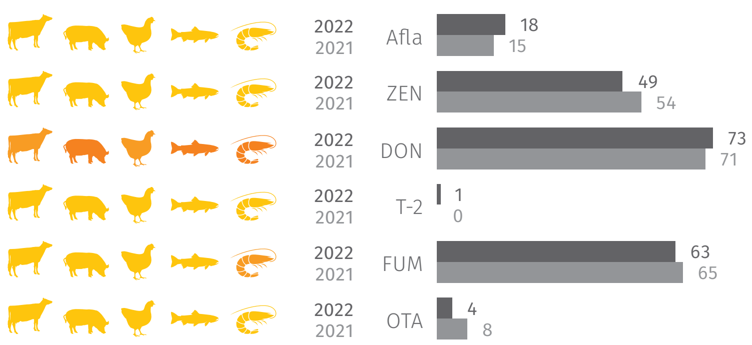


Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow =moderate to red=extreme see color code page 2)

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

Total samples: 75	Afla	ZEN	DON	T-2	FUM	OTA
Number of samples tested	75	72	75	75	75	75
% Contaminated samples	25%	64%	77%	40%	85%	17%
Average of positive (ppb)	4	64	674	20	692	5
Median of positive (ppb)	1	31	320	19	240	3
Maximum (ppb)	8	403	4 389	36	5 235	13

Sub-saharan Africa



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)

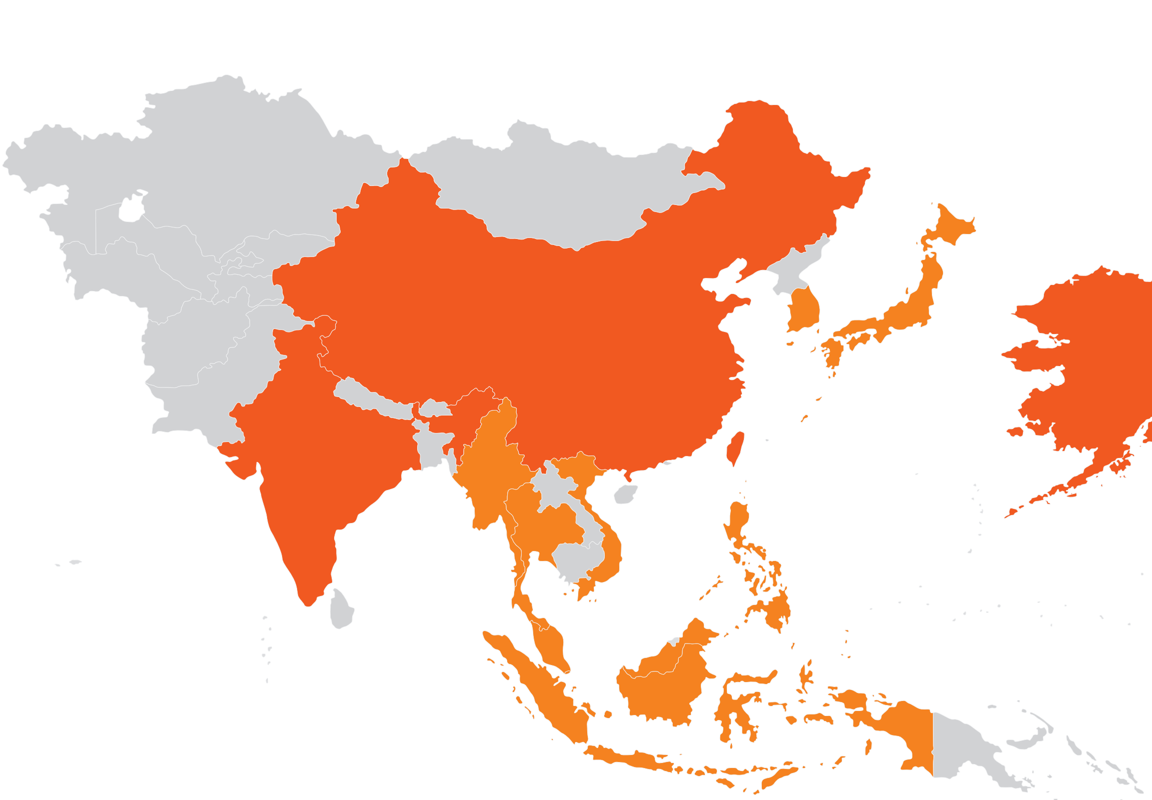
% Contaminated samples January–June 2022 ■ and January–June 2021 ■

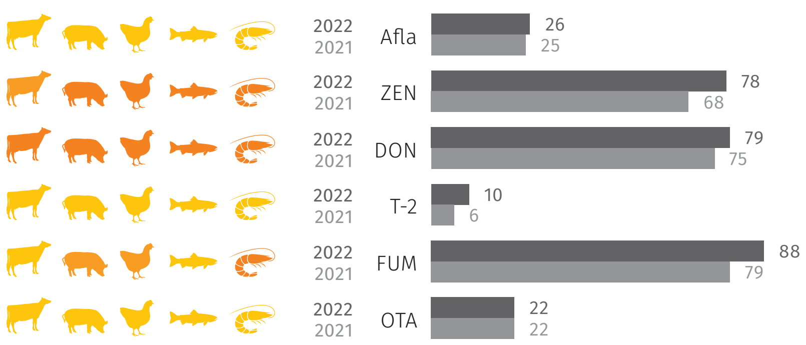
Total samples: 277	Afla	ZEN	DON	T-2	FUM	OTA
Number of samples tested	277	277	277	277	277	277
% Contaminated samples	18%	49%	73%	1%	63%	4%
Average of positive (ppb)	15	86	440	4	713	5
Median of positive (ppb)	4	19	238	2	217	3
Maximum (ppb)	116	1 515	3 766	12	10 660	16

DSM World Mycotoxin Survey

The Global Threat – January to June 2022

Asia



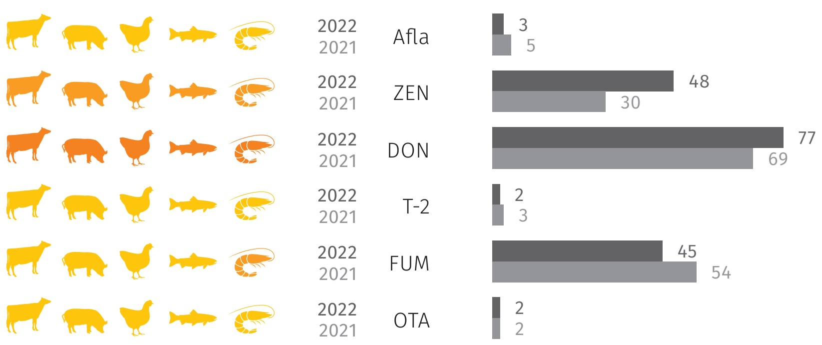


Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow=moderate to red=extreme see color code page 2)

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

Total samples: 1 719	Afla	ZEN	DON	T-2	FUM	OTA
Number of samples tested	1 715	1 688	1717	1 672	1673	1 647
% Contaminated samples	26%	78%	79%	10%	88%	22%
Average of positive (ppb)	36	333	1 145	28	1 713	9
Median of positive (ppb)	8	87	677	20	751	4
Maximum (ppb)	2 194	17 409	20 600	150	40 363	157

North America

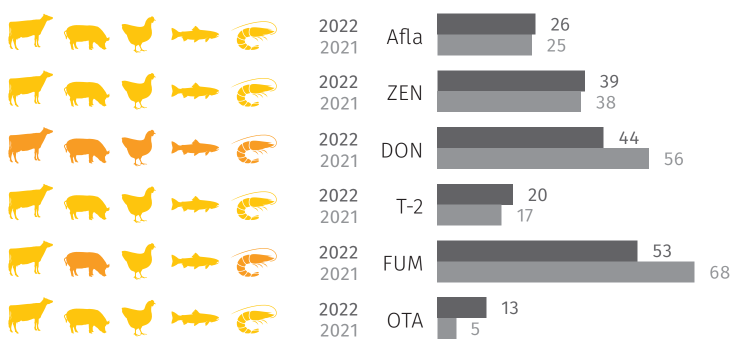


Animal colours indicate the risk posed to this species by the prevalence and concentration of each mycotoxin in all samples from this region (yellow =moderate to red=extreme see color code page 2)

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

Total samples: 701	Afla	ZEN	DON	T-2	FUM	OTA
Number of samples tested	696	699	699	698	699	699
% Contaminated samples	3%	48%	77%	2%	45%	2%
Average of positive (ppb)	11	323	1 265	85	1 861	9
Median of positive (ppb)	2	142	611	47	627	3
Maximum (ppb)	94	9 437	17 673	343	44 347	75

Latin America



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–June 2022 ■ and January–June 2021 ■

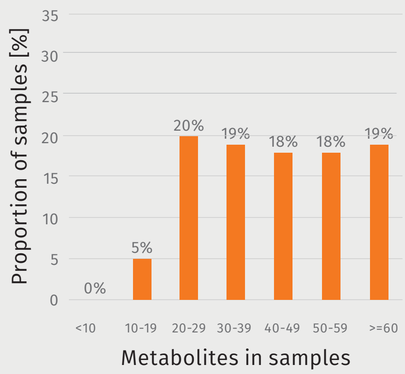
Total samples: 5 678	Afla	ZEN	DON	T-2	FUM	OTA
Number of samples tested	4 909	4 307	4 679	2 274	4 698	1 177
% Contaminated samples	26	39	44	20	53	13
Average of positive (ppb)	5	99	595	35	1 165	4
Median of positive (ppb)	2	52	420	22	690	3
Maximum (ppb)	193	5 066	16 000	450	18 290	23

DSM World Mycotoxin Survey

Multiple Mycotoxin Overview: Spectrum 380®

Multiple mycotoxin occurrence

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



44
average number
of Mycotoxins
and Metabolites
per sample

9.8
out of
10
samples contaminated
with *Fusarium* toxins

100 %
Contained
10
or more
mycotoxins and
metabolites

Number of Samples: 267

In which commodities are emerging mycotoxins most commonly found?

Wheat:
Enniatin B 100%
Aurofusarin 100%

Straw:
Enniatin B 100%
Enniatin B1 100%

*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.

Mycotoxins & metabolites

Metabolite	Prevalence	Average	Maximum
cyclo(L-Pro-L-Tyr)	90%	506	14 414
Aurofusarin	86%	344	8 794
cyclo(L-Pro-L-Val)	84%	1 244	11 530
Enniatin B	83%	53	780
Abscisic acid	81%	201	3 260
Tryptophol	80%	264	3 360
Culmorin	78%	576	17 210
Equisetin	77%	49	1 055
Beauvericin	75%	25	897
Enniatin B1	75%	31	393
Brevianamid F	73%	46	376
Moniliformin	73%	121	7 066
Deoxynivalenol	72%	542	6 348
Altersetin	67%	96	1 559
Infectopyron	66%	4 221	73 000
Fellutanine A	66%	65	1 087
Antibiotic Y	65%	196	11 688
Bikaverin	64%	27	729
Flavoglaucin	63%	256	29 569
Siccanol	63%	1 143	12 341
15-Hydroxyculmorin	62%	378	7 415
Zearalenone	62%	66	1 233
Emodin	62%	31	727
Asperphenamate	60%	38	1 491
Rugulusovin	60%	63	823
Asperglaucide	59%	84	2 107
Enniatin A1	57%	14	193
Genistin	57%	40 807	234 000
Genistein	55%	8 613	116 495
Tenuazonic acid	54%	303	11 512
Endocrocin	54%	136	3 099
DON-3-glucoside	51%	101	1 608
Daizein	51%	6 868	67 413
Daizin	51%	34 958	210 200

Positive Samples [%] for metabolites present in 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 positives and Maximum are presented in ppb.

REP_MTXsurvey_Q2_2022_EN_0722_AUE