Mycotoxin Occurrence in 2021 US By-Product Ingredients

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Overview

Data as presented at the 2022 ASAS Annual Meeting in Oklahoma City

- Our monthly corn by-products data set has been divided into two key ingredient categories:
  - US Corn Distiller's Dried Grains with Solubles (DDGS)
    - 48 samples submitted from 8 states
  - US Corn Gluten Products
    - 22 samples submitted from 4 states

- US Wheat Middlings ("Midds")
  - 28 samples submitted from 4 states

2021 US Corn DDGS (as-fed basis*)

*Wet DDGS sample results have been adjusted to dry basis

Mycotoxins & Analysis

LC-MS/MS

ROMER
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The survey results represent samples sent in for surveillance testing only and does not include any sample submitted following clinical signs.

Mycotoxin Group*	Mycotoxins	Limit of Detection (ppb)
Aflatoxins (Afla)	Aflatoxin B1	1.3
	Aflatoxin B2	1.2
	Aflatoxin G1	1.1
	Aflatoxin G2	1.6
A-Trichothecenes (A-Trich)	T-2 Toxin	100.0
	HT-2 Toxin	100.0
	Neosolaniol	100.0
	Diacetoxyscirpenol (DAS)	100.0
B-Trichothecenes (B-Trich)	Deoxynivalenol (DON/Vomitoxin)	100.0
	Acetyldeoxynivalenol (AcDON)	100.0
	Nivalenol (NIV)	100.0
	Fusarenon X (FusX)	100.0
Fumonisins (FUM)	Fumonisin B1	100.0
	Fumonisin B2	100.0
	Fumonisin B3	100.0
Zearalenone (ZEN)	Zearalenone (ZEN)	51.7
Ochratoxin A (OTA)	Ochratoxin A (OTA)	1.1

*Results are reported as the summation of mycotoxin levels detected per Mycotoxin Group.
(For example, B-Trich represents total contamination detected for DON + AcDON + NIV + FusX)

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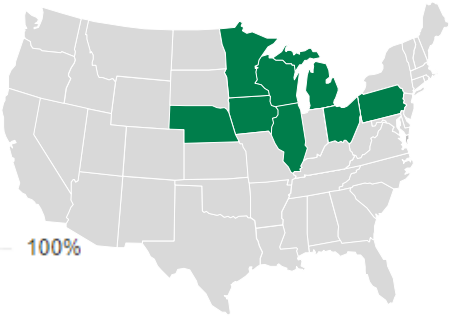
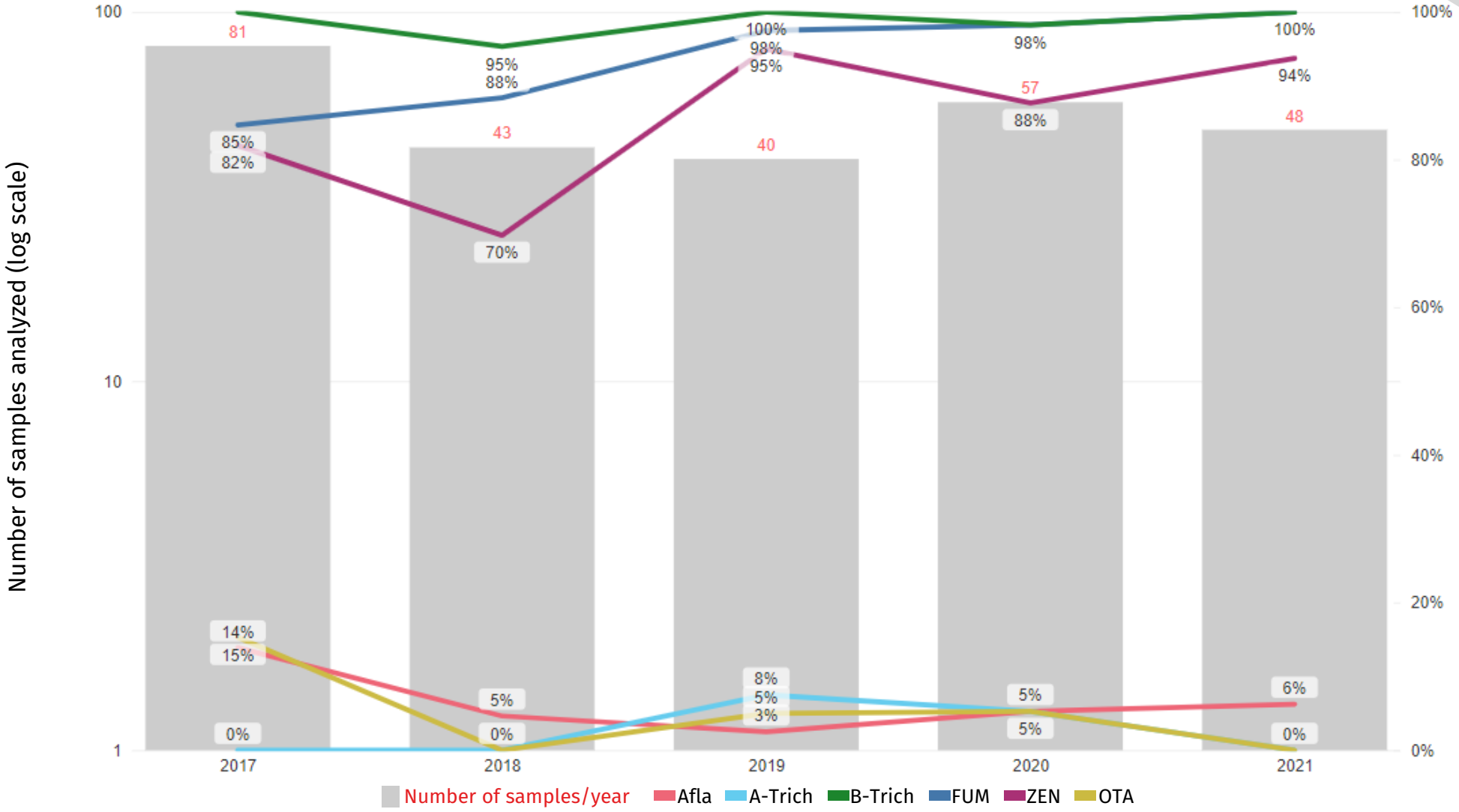
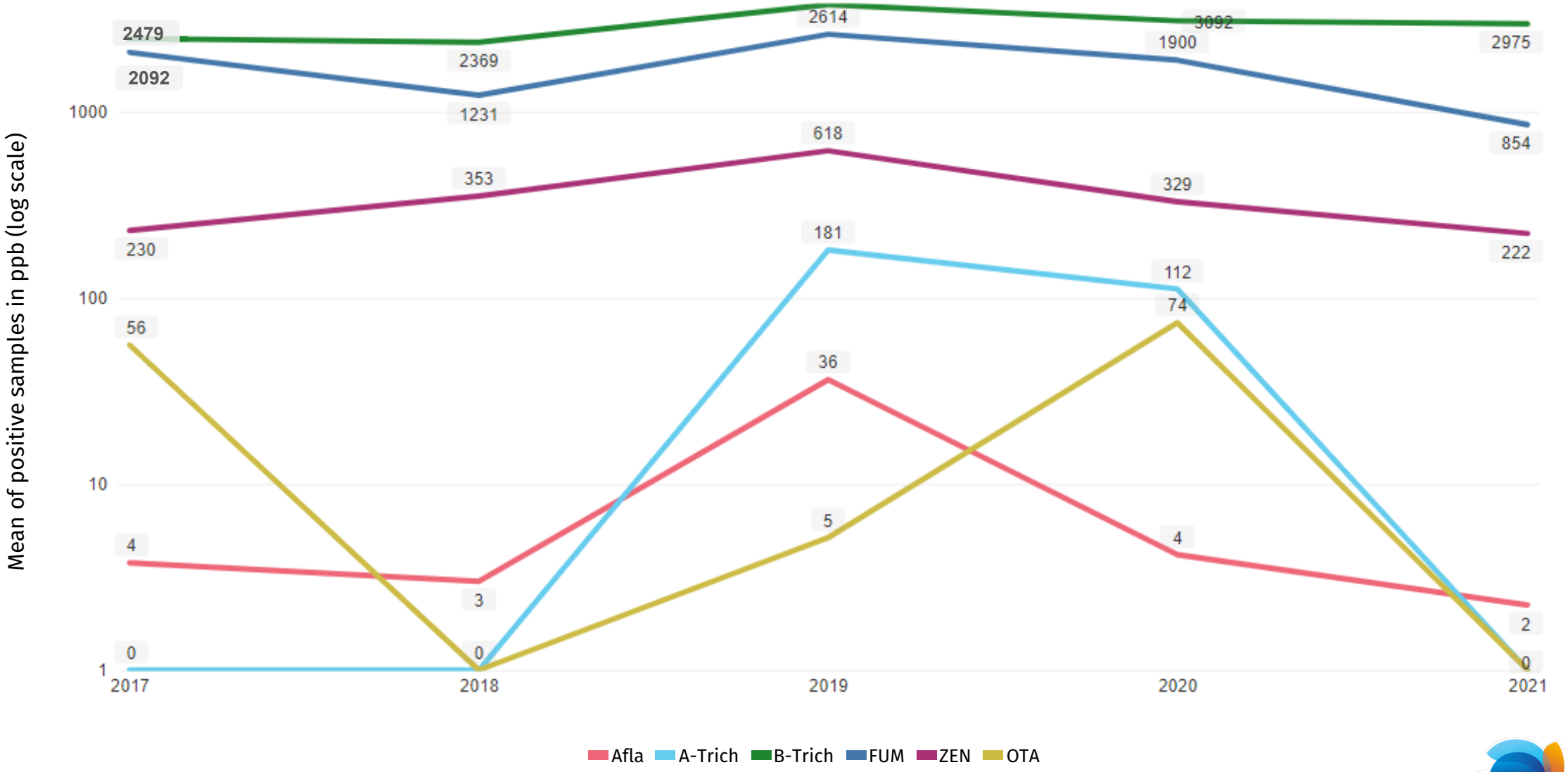
Occurrence Trend in 2021 US Corn DDGS





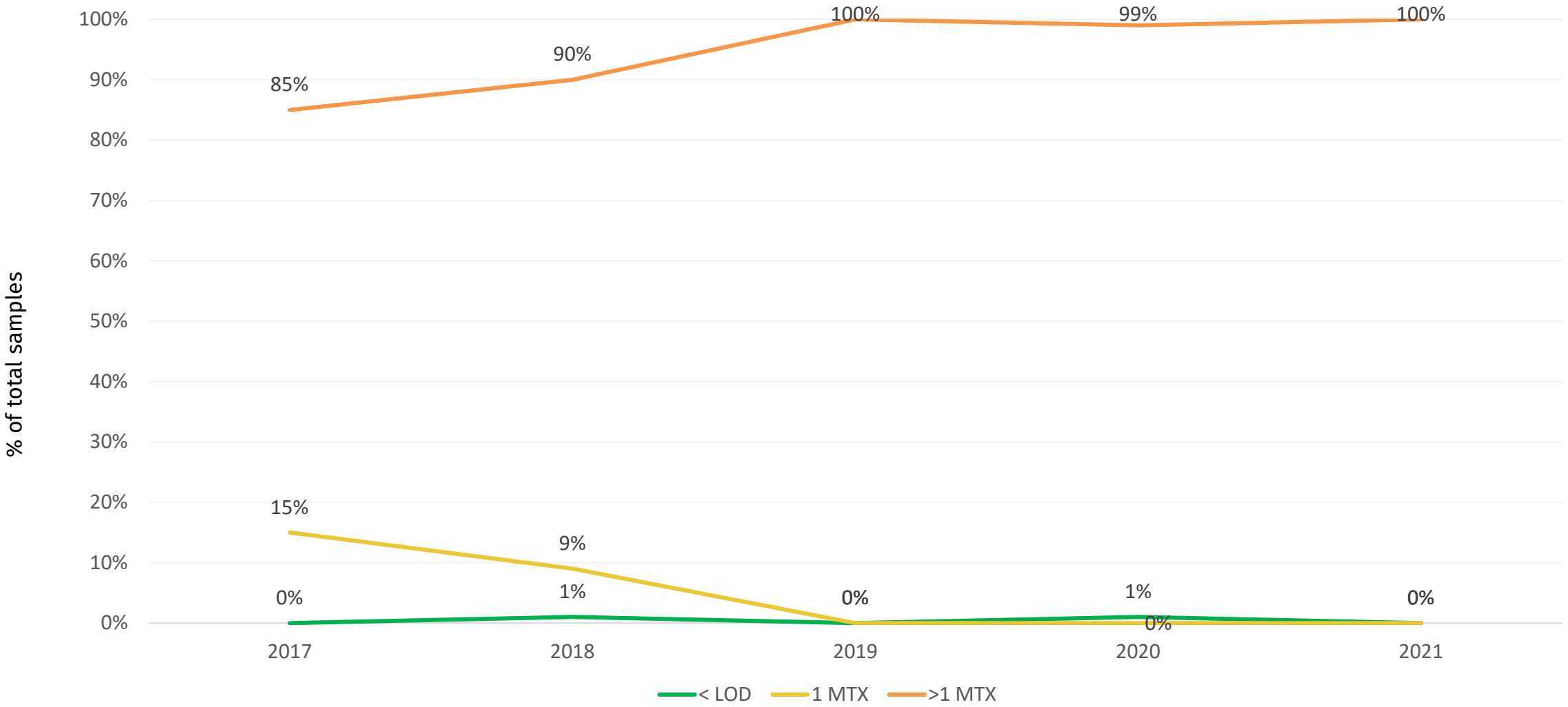
Based on the samples analyzed.

Mean of Positives Trend in 2021 US Corn DDGS



Based on the samples analyzed.

Co-occurrence Trend in 2021 US Corn DDGS



Based on the samples analyzed. Values may not total 100% due to rounding.

2021 US Corn Gluten Products (as-fed basis*)

*Wet corn gluten sample results have been adjusted to dry basis

Mycotoxins & Analysis

LC-MS/MS

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	Acetyldeoxynivalenol (AcDON)	100.0
	Nivalenol (NIV)	100.0
	Fusarenon X (FusX)	100.0
Fumonisins (FUM)	Fumonisin B1	100.0
	Fumonisin B2	100.0
	Fumonisin B3	100.0
Zearalenone (ZEN)	Zearalenone (ZEN)	51.7
Ochratoxin A (OTA)	Ochratoxin A (OTA)	1.1

*Results are reported as the summation of mycotoxin levels detected per Mycotoxin Group.
(For example, B-Trich represents total contamination detected for DON + AcDON + NIV + FusX)

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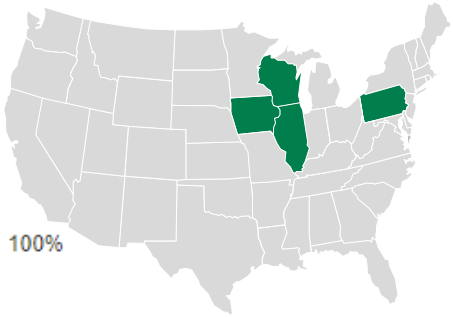
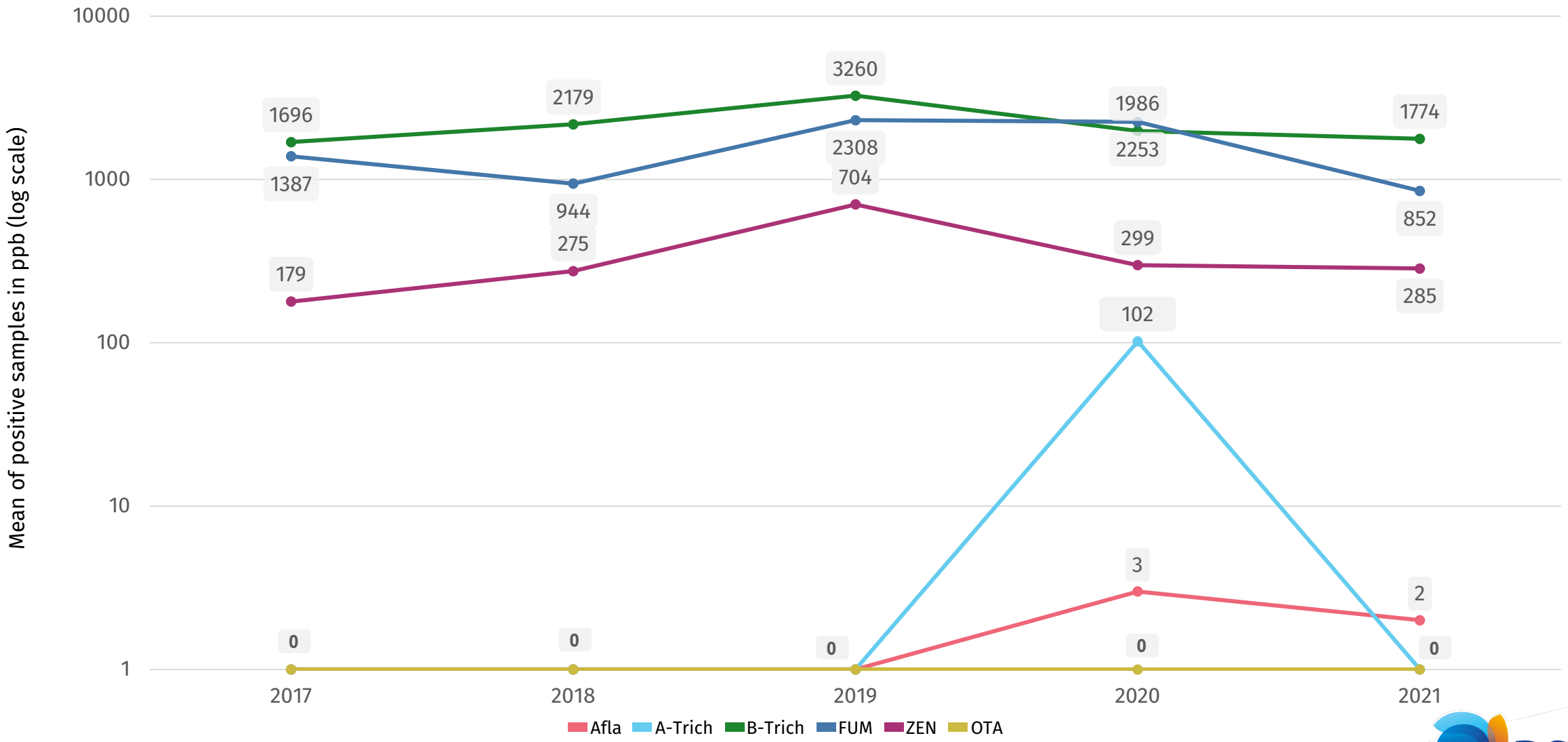
Occurrence Trend in 2021 US Corn Gluten Products



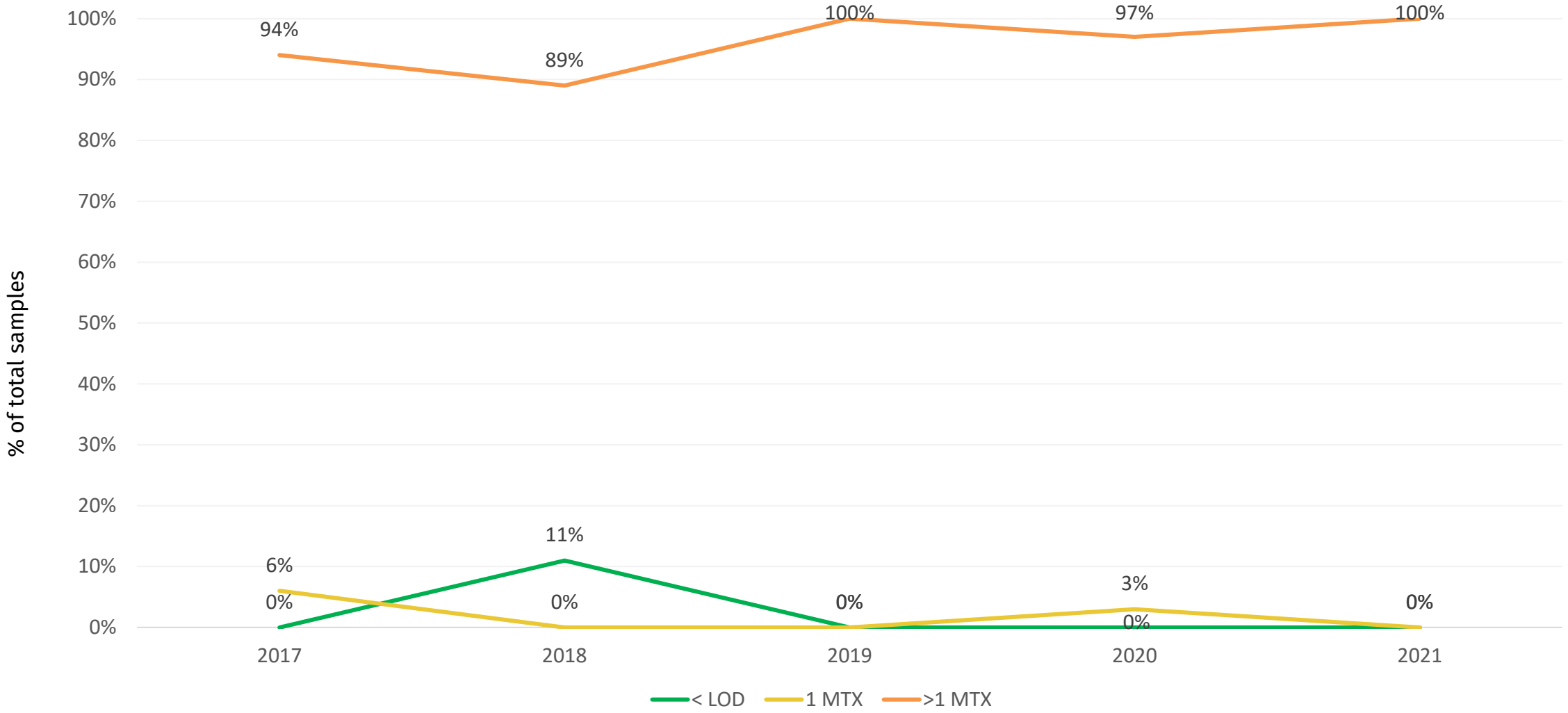
Based on the samples analyzed.

Mean of Positives Trend in 2021 US Corn Gluten Products



Based on the samples analyzed.

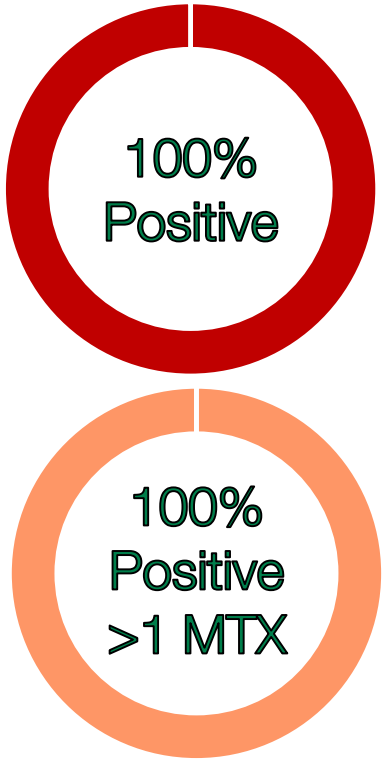
Co-occurrence Trend in 2021 US Corn Gluten Products



Based on the samples analyzed. Values may not total 100% due to rounding.

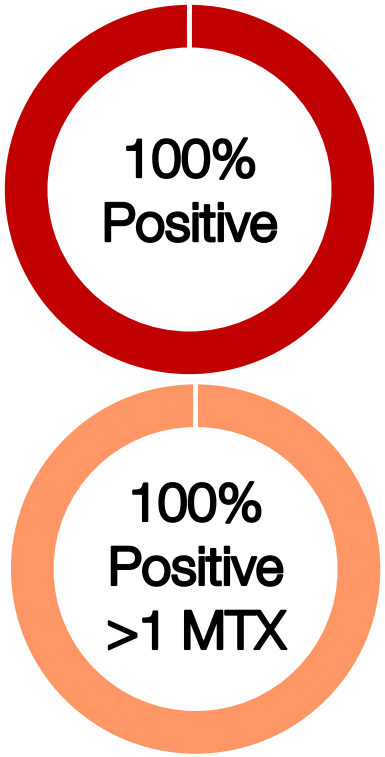
2021 US Corn By-Products Summary

48 corn DDGS samples



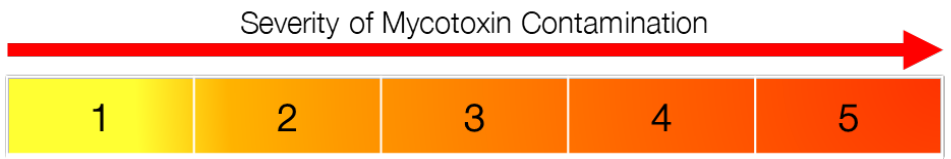
B-Trich	• 100% positive • 2975 ppb
FUM	• 100% positive • 854 ppb
ZEN	• 94% positive • 222 ppb

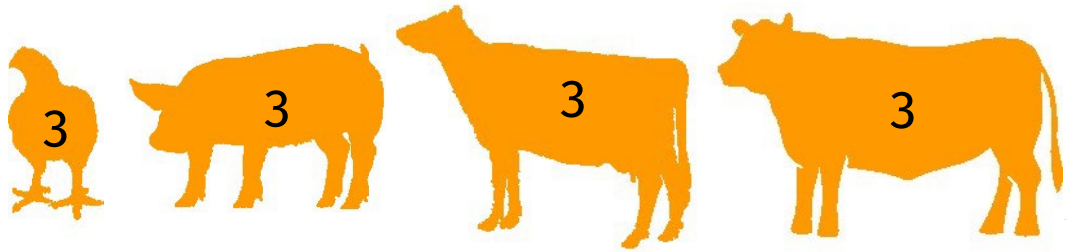
22 corn gluten product samples



B-Trich	• 100% positive • 1774 ppb
FUM	• 100% positive • 852 ppb
ZEN	• 74% positive • 285 ppb

Forecasted potential risk for livestock production*:





*Based on the samples analyzed.

2021 US Wheat Middlings (as-fed basis)

Mycotoxins & Analysis

LC-MS/MS

Actlabs
Quality Analysis... Innovative Technologies

ROMER
Romer Labs®

The survey results represent samples sent in for surveillance testing only and does not include any sample submitted following clinical signs.

Mycotoxin Group	Mycotoxins
Aflatoxins (Afla)	Aflatoxin B1
	Aflatoxin B2
	Aflatoxin G1
	Aflatoxin G2
A-Trichothecenes (A-Trich)	T-2 toxin
	HT-2 toxin
	Diacetoxyscirpenol
	Neosolaniol[R]
B-Trichothecenes (B-Trich)	Deoxynivalenol
	Acetyl-deoxynivalenol
	Nivalenol[R]
	FusarenonX[R]
Fumonisins(FUM)	FumonisinB1
	FumonisinB2
	FumonisinB3[R]

Mycotoxin Group	Mycotoxins
Zearalenone (ZEN)	Zearalenone
OchratoxinA (OTA)	Ochratoxin A
Emerging Mycotoxins (EM)	Sterigmatocystin[A]
	Mycophenolic Acid[A]
Ergot Alkaloids* (Ergots)	Ergocornine[A]
	Ergocristine[A]
	Ergocryptine[A]
	Ergometrine[A]
	Ergosine[A]
	Ergotamine[A]

[A] Offered at ActLabs
[R] Offered at Romer Labs
Metabolites without superscript offered at both labs.

Subset of samples during survey period were screened for the presence of Ergot Alkaloids

*Results are reported as the summation of mycotoxin levels detected per Mycotoxin Group.
(For example, B-Trich represents total contamination detected for DON + AcDON + NIV + FusX)

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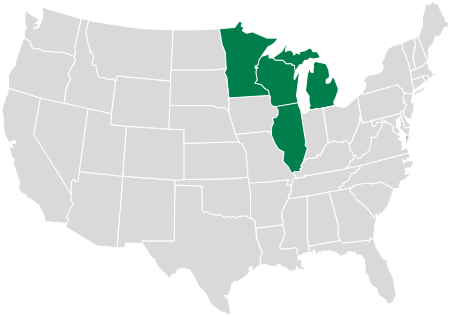
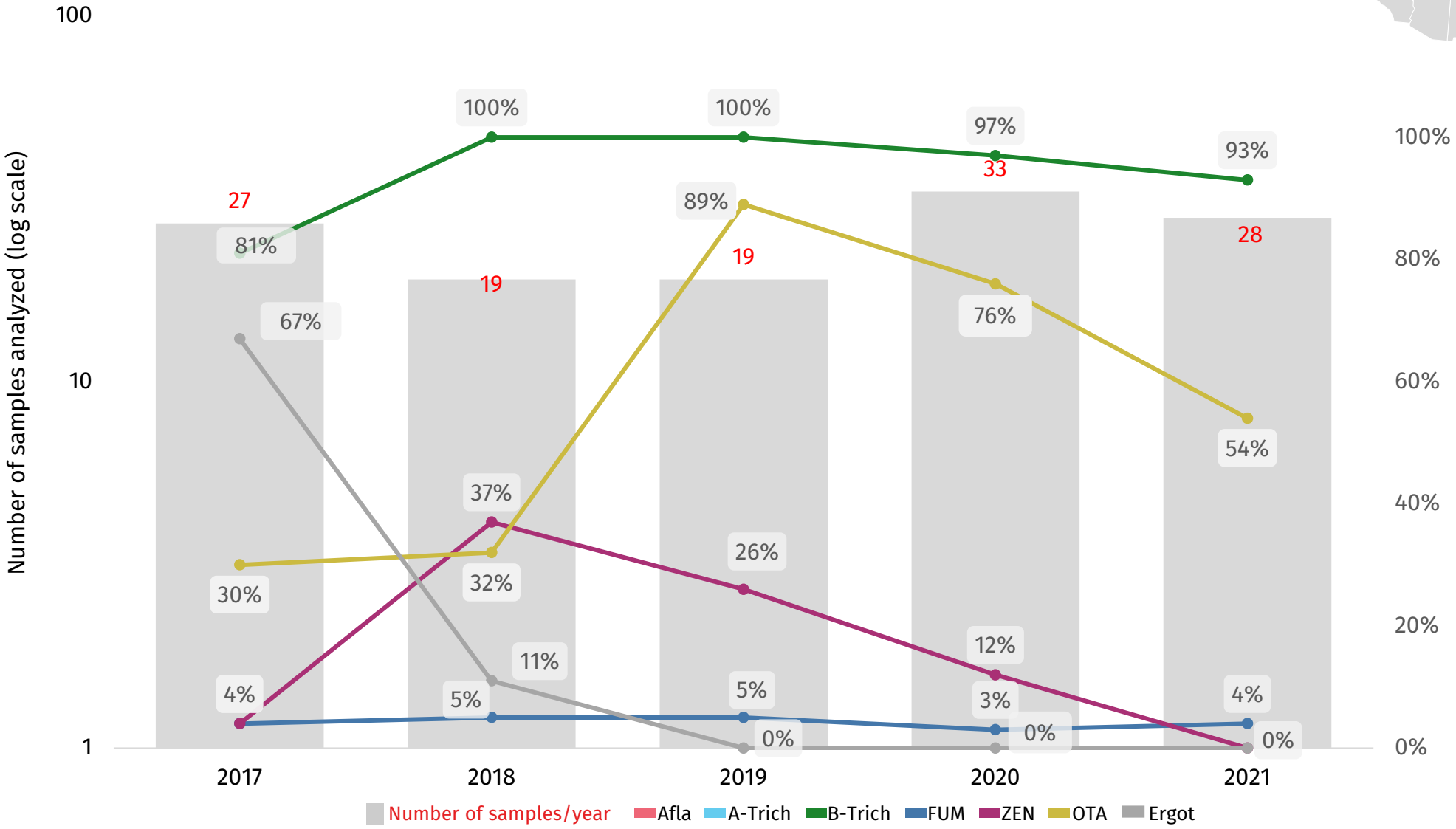
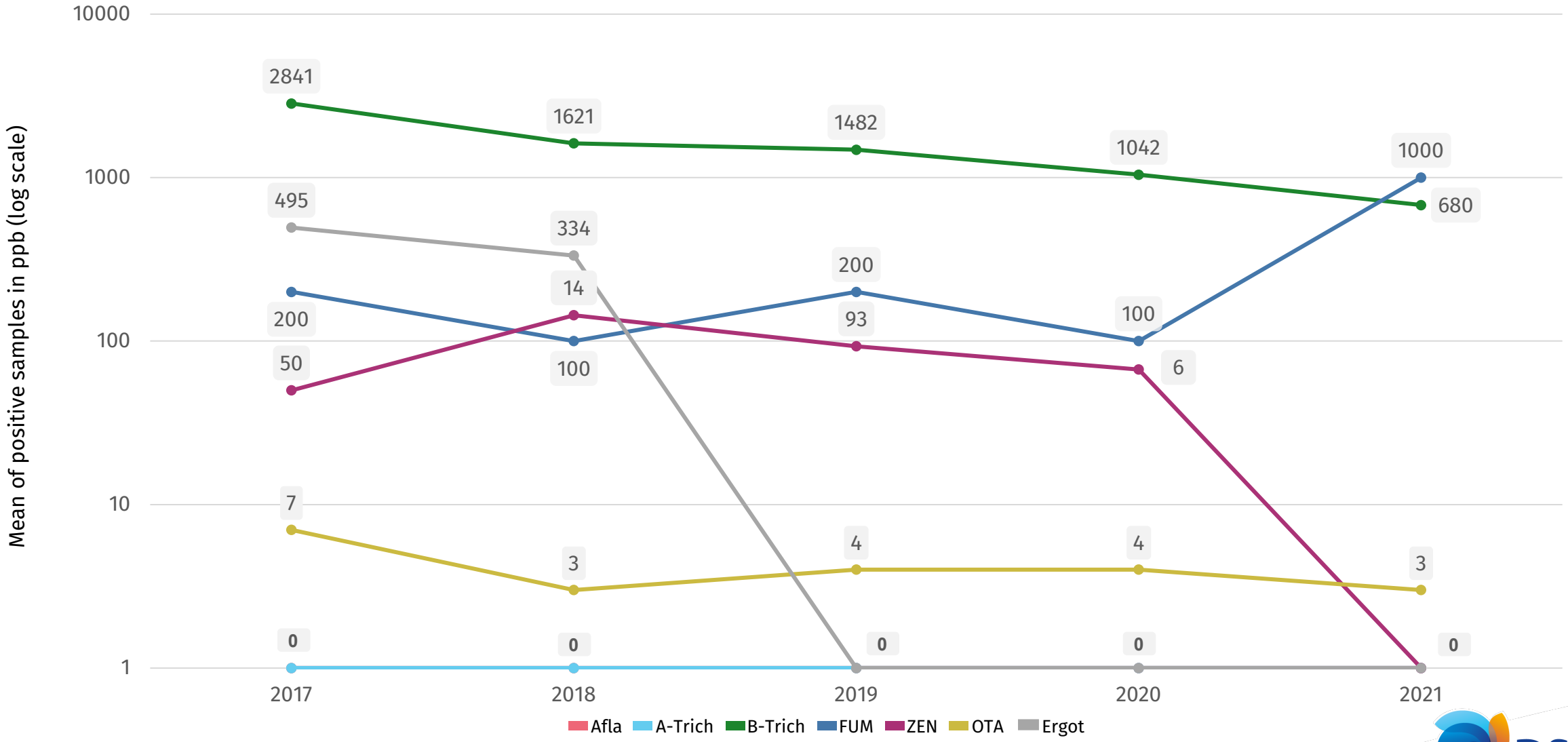
Occurrence Trend in 2021 US Wheat Midds





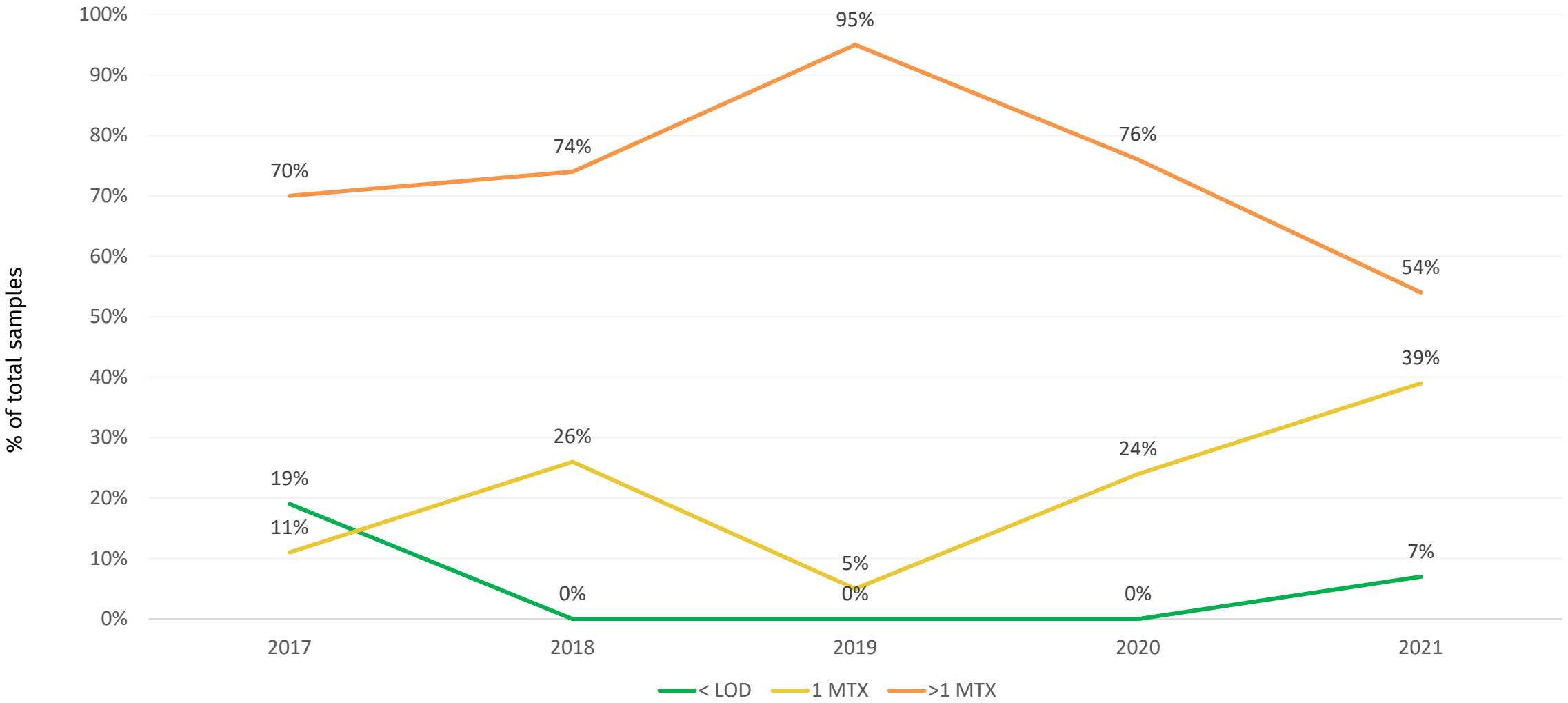
Based on the samples analyzed.

Mean of Positives Trend in 2021 US Wheat Midds



Based on the samples analyzed. 2019-2021 samples not screened for presence of ergot alkaloids.

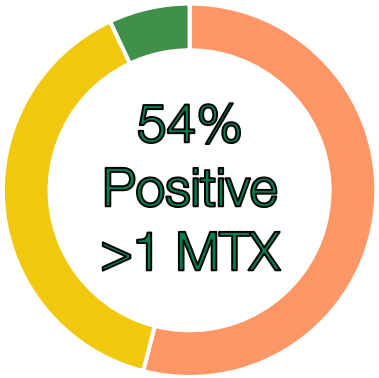
Co-occurrence Trend in 2021 US Wheat Midds



Based on the samples analyzed. Values may not total 100% due to rounding.

2021 US Wheat Midds Summary

28 wheat midds samples



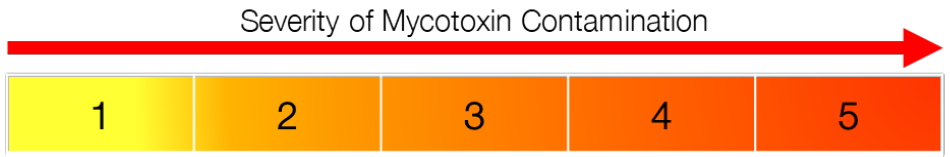
B-Trich
- 93% positive
- 2975 ppb

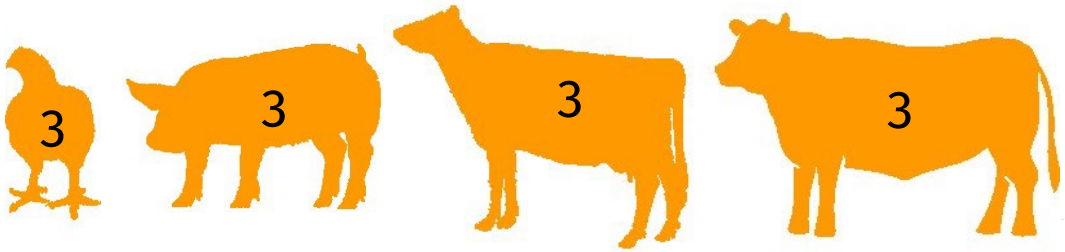
OTA
- 54% positive
- 3 ppb

FUM
- 4% positive
- 1000 ppb

Screening for ergot alkaloids is also recommended based on historical results.

Forecasted potential risk for livestock production*:





*Based on the samples analyzed.

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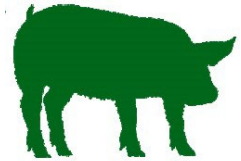

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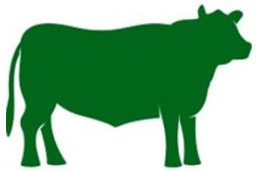

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dsm.com/mycotoxin-survey

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