MycoMan
Harvest bulletin

Mycotoxin contamination in newly harvested grain is a very important parameter to consider. That grain is used to feed the animals for the whole year, until the next harvest. As the saying goes, "knowing the enemy is half the battle won." In turn, if we know the level of contamination, we can think about the best use of the wheat: to which animal species can it be fed (avoiding the more sensitive species in cases of high contamination or decreasing the level of wheat in their diet) and which MycoMan Program product should be used to decrease the possible negative effects of contamination on animal performance and health.

BRAZIL - CORN

1st and 2nd harvests, 2020

Sampling

1063 Total number of samples

Collected directly from farms and animal feed production sites, before storage

Analyzed by liquid chromatography tandem mass spectrometry (LC MS/MS) at LAMIC, in Brazil

Screening for nine mycotoxins: fumonisin B_1 (FB_1), fumonisin B_2 (FB_2), aflatoxin B_1 (AFB_1), aflatoxin B_2 (AFB_2), aflatoxin G_1 (AFG_1), aflatoxin G_2 (AFG_2), zearalenone (ZEA), deoxynivalenol (DON), ochratoxin A (OTA), cyclopiazonic acid (CPA), HT-2 toxin (HT-2) and T-2 toxin (T-2)

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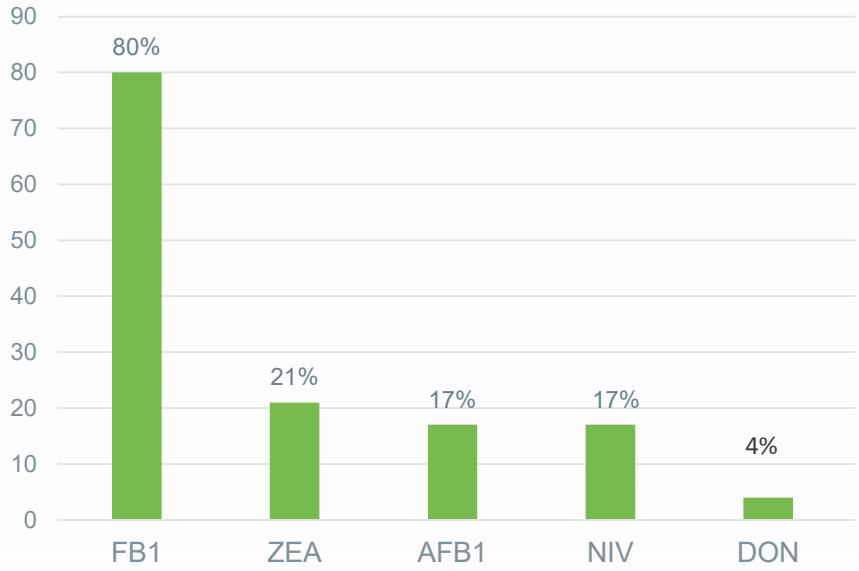
Mycotoxin occurrence in newly harvested corn from Brazil, 2020 (%)



Key outcomes

80% Samples contaminated with **Fumonisin B_1**

- **Highest sample: 16,614 µg/kg**
- **Average [ ]: 1,275 µg/kg**

Relatively low concentration, but could have harmful consequences, if fed to sensitive species like swine or horses

21% Samples contaminated with **Zearalenone**

- **Highest sample: 1,163 µg/kg**
- **Average [ ]: 98 µg/kg**

Medium concentration, but could lead to reproductive issues in sensitive animals, such as piglets and sows

17% Samples contaminated with **Aflatoxins**

- **Highest sample: 21.2 µg/kg**
- **Average [ ]: 6 µg/kg**

Medium risk for dairy cows

15% Samples contaminated with **Nivalenol**

- **Highest sample: 257 µg/kg**
- **Average [ ]: 135 µg/kg**

Low level of contamination

Non-detection levels were based on the test method's limits of quantification (LOQ) for each mycotoxin: AFB_1 < 1 µg/kg; ZEA < 20 µg/kg; DON < 200 µg/kg; FB_1 < 125 µg/kg; FB_2 < 125 µg/kg; OTA < 2.5 µg/kg; T-2 toxin < 100 µg/kg; HT-2 toxin < 100 µg/kg; and CPA<5 µg/kg.

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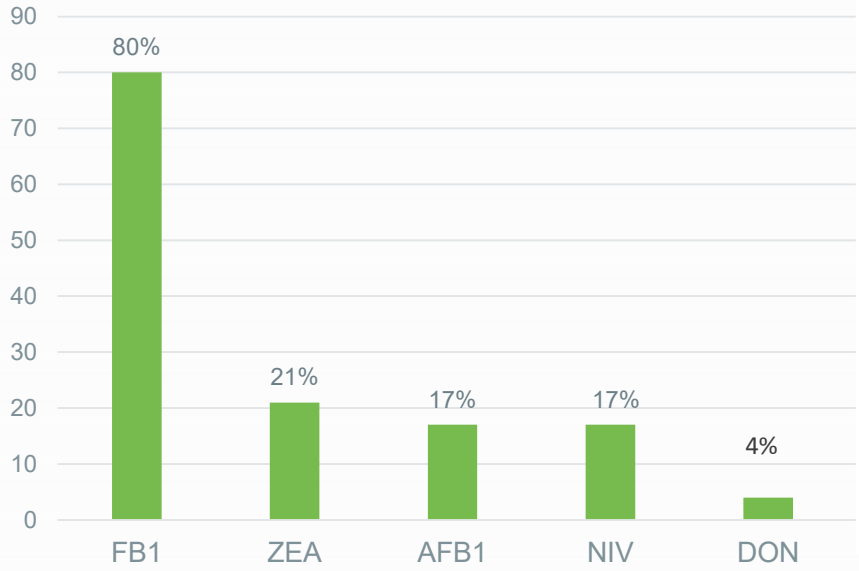

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Big picture

Brazil corn contamination levels and risk assessment

	AFB1	FB1	ZEA	DON	NIV
Number of samples	1,063	984	880	890	111
% positive samples	17	80	21	4	15
Maximum (µg/kg)	21	16,614	1,163	2,058	257
Average in positive samples (µg/kg)	6	1,275	98	340	135

Low risk
Medium risk
High risk

Only 4% of the samples contained DON. The average level was low (340 µg/kg), but the highest concentration of DON found in a single sample was 2,058 µg/kg. So, the level of contamination of the Type B trichothecene mycotoxins DON and NIV poses a medium risk to sensitive animal species like pigs and horses.

Risk of synergies

Overall, low to medium levels of mycotoxins were present. However, five mycotoxins were found in a multiple mycotoxin contamination: AFB_1, FB_1, ZEA, DON and NIV. Possible synergism, or the additive effect of mycotoxins, also needs to be taken into consideration. Multiple mycotoxins at low to medium levels can have negative effects on animal health, reproduction and performance.

The word of our expert

Julia Dvorska
Global Scientific & Technical Manager
Mycotoxin Management

Based on the results of this survey, the 2020 corn crop in Brazil should not automatically be considered safe for inclusion in finished feed rations for all animal species. Special attention should be paid to the medium-level average concentration of FB_1 (1,275 µg/kg), which was found in 80% of the samples, with a maximum concentration of 16,614 µg/kg. According to our risk assessment table, the average DON and NIV levels pose a low to medium risk to sensitive animals like piglets, sows, boars and horses. AFB_1 was detected at an average of 6 µg/kg, which represents a medium risk for dairy cows. ZEA levels were low, indicating a low risk to animal health and performance. In view of the detected mycotoxins and their levels, there is a greater probability of observing negative effects of the mycotoxin cocktail (FB_1, AFB_1, ZEA, DON and NIV) when rations are made of more than 50% corn. The results of Adisseo's 2020 analysis of newly harvested wheat in Brazil show that, in terms of mycotoxin contamination, the quality of this year's harvest is cause for concern.

However, supplementing feed with Mycotoxin Management products is an effective strategy for preventing the negative effects of mycotoxins on animal health and performance.

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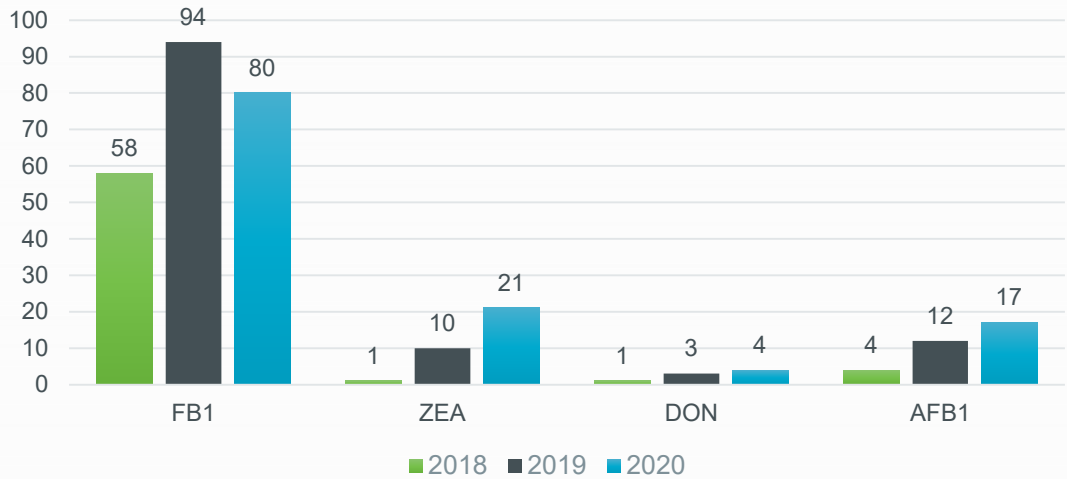
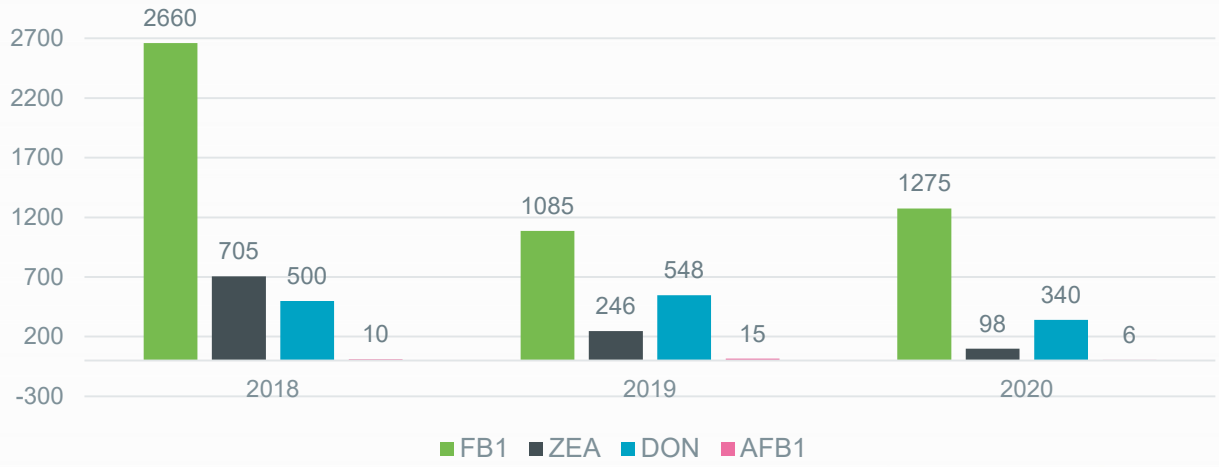
Multi-year risk

FB_1, ZEA, DON and AFB_1 contamination, 2018-2020 (% of positive samples)



A comparison of the average concentrations (µg/kg) found in positive samples in 2018, 2019 and 2020 reveals a consistent trend: average levels of ZEA and AFB_1 in positive samples were significantly lower in 2020 than in 2019 and 2018. This year's average FB_1 was lower than in 2018 but higher than last year (2,660 µg/kg in 2018, 1,085 in 2019 and 1,275 in 2020). Average AFB_1 was 6 µg/kg in 2020, lower than in 2019 (15 µg/kg) and 2018 (10 µg/kg).

Average contamination of positive samples, 2018-2020 (µg/kg)



In 2020, the number of samples of corn contaminated with ZEA, DON and AFB was higher than in previous years, with the occurrence of mycotoxins increasing year after year, over the last three years. Only the number of FMB_1-contaminated samples was lower in 2020 than in 2019 (80% and 94%, respectively).