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MYCORAID

Mycotoxin contamination in South Africa:

IMPLICATIONS FOR POULTRY IMMUNE SYSTEM RESPONSE

In South Africa, maize is a central raw material for animal feed, and its exposure to field and storage fungi creates a continuous risk of contamination with Fusarium- and Aspergillus-derived metabolites. Co-occurrence was present in all analysed corn samples from South Africa from 2025-harvest, meaning that every sample contained more than one mycotoxin. This is highly relevant because poultry are rarely exposed to a single toxin under commercial conditions; instead, birds consume complex mixtures that may act additively or synergistically, even when individual concentrations appear moderate.

Mycotoxin contamination in corn samples from South Africa in 2025

	Average (ppb)	Maximum (ppb)	Median (ppb)	Minimum (ppb)	Prevalence (%)
15-ADON	114	723	97	23	90
BEA	100	1,592	8	1	95
D-3-G	62	109	63	5	10
DON	**1,649**	**13,128**	**1,197**	**55**	**97**
FA	126	1,250	41	4	96
FB_1	**858**	**3,444**	**277**	**24**	**29**
FB_2	**435**	**1,602**	**278**	**18**	**23**
FB_3	**149**	**403**	**105**	**13**	**18**
MON	25	138	14	3	38
OTA	**5**	**11**	**4**	**2**	**14**
ZEN	**84**	**789**	**47**	**8**	**62**

In South African corn, the dominant mycotoxins detected were beauvericin (BEA), deoxynivalenol (DON), fusaric acid (FA), and zearalenone (ZEN). This profile is typical of a Fusarium-driven contamination pattern and should not be interpreted only through the lens of classical regulated mycotoxins. Emerging mycotoxins such as BEA and FA are not always included in routine feed monitoring, but their presence is important because they can contribute to gut irritation, oxidative stress, impaired cellular function, and higher sensitivity to other toxins. DON and ZEN are better known, but they also interact with other contaminants and can reduce performance even when present below levels that would cause acute clinical signs.

Low risk | Moderate risk | High risk | Critical risk

South African mycotoxin co-contamination compromises poultry immune function

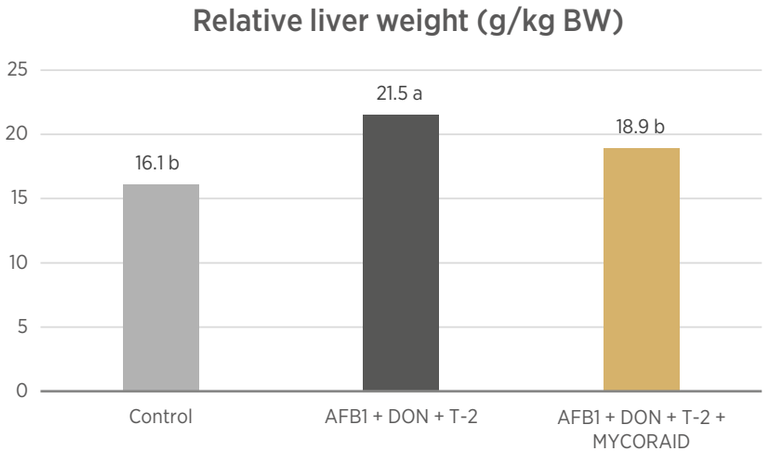
For poultry, the risk was assessed as moderate, while pigs and aquaculture were classified as high-risk species. This does not mean that poultry can be ignored. Broilers, layers, and breeders are highly sensitive to subclinical disturbances in feed intake, gut integrity, immune response, liver function, and nutrient utilization. A moderate risk in poultry can still translate into considerable economic losses because modern birds have high genetic potential and limited physiological reserves. Small reductions in feed intake, body weight gain, laying rate, eggshell quality, or vaccine response can quickly affect flock profitability.

DON is primarily associated with reduced feed intake, impaired gut barrier function, lower villus integrity, and poorer nutrient absorption. Even if poultry are more tolerant to DON than pigs, broilers exposed to DON-containing diets may show reduced performance, higher intestinal permeability, and increased susceptibility to enteric challenges. ZEN is best known for its estrogenic effects, and although poultry are less sensitive than swine, ZEN should not be ignored in breeders and laying hens, where reproductive efficiency, egg production, and eggshell quality are central economic traits. Fusaric acid can contribute to reduced feed intake and may intensify the effects of other Fusarium toxins. Beauvericin is an emerging mycotoxin with cytotoxic and ionophoric properties, and its co-occurrence with DON, ZEN, or fumonisins may increase the biological pressure on gut and immune function.

MYCORAID: multilayered support during mycotoxin challenge

MYCORAID was developed as a multilayered mycotoxin management solution combining specially selected minerals, microbial components, yeast cell wall fractions, and plant extracts. This approach is important because the South African contamination profile is not dominated by one single toxin. Adsorption is relevant for many polar and less-polar mycotoxins, while microbial bioremediation contributes to the management of toxins such as aflatoxin B1, ochratoxin A, and zearalenone. Yeast cell wall components support immune function, and plant extracts support liver resilience during periods of toxic pressure.
Trials in **MYCORAID** are especially relevant for markets such as South Africa, where feed contamination is characterized by co-occurrence.

In the Indian broiler trial with combined aflatoxin B1, DON, and T-2 toxin, mycotoxin challenge increased relative liver weight and aspartate aminotransferase (AST) levels. Mycotoxin exposure causes hepatocellular damage, inflammation, and cellular degeneration, leading to enlarged livers and leakage of AST into the bloodstream. Increased liver weight and elevated AST therefore indicate mycotoxin-induced liver stress and impaired hepatic function **MYCORAID** helped normalize liver enzyme activities and improved immune response (Figure 1 and 2).



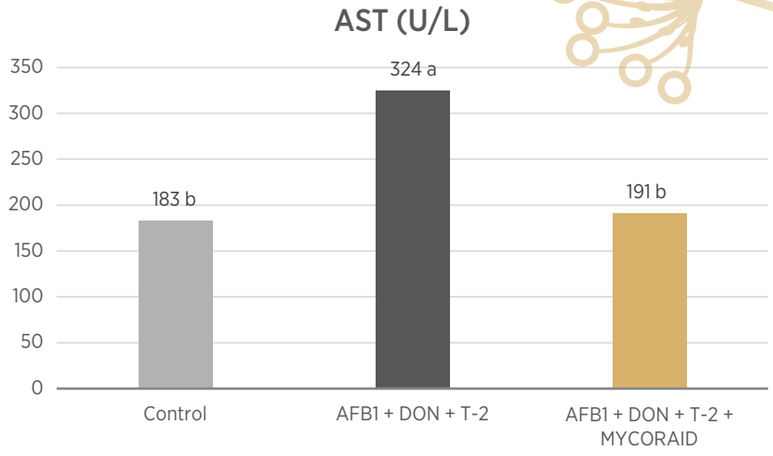


Figure 1 and 2. MYCORAID alleviates destructive effect of a mycotoxin mixture on broiler liver (India, 2021) a,b ($p<0.05$)

Conclusions

South African corn samples should be considered a multi-mycotoxin challenge rather than a single-toxin problem. BEA, DON, FA, and ZEN dominance, combined with universal co-occurrence, indicates a complex Fusarium-type risk profile. For poultry, such contamination can compromise gut health, immunity, liver function, performance, and egg-related parameters. Because clinical signs may be absent, routine feed analysis and risk-based product application are essential.

MYCORAID offers a practical strategy for this situation because it addresses mycotoxin risk through multiple mechanisms: adsorption, bioremediation, liver support, and immune support. For South African poultry producers working with maize-based diets, this makes MYCORAID a relevant tool to help maintain performance and resilience under moderate but complex mycotoxin pressure.

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