

Client:

Laboratory:

Date:



AMERICAN FEED CORPORATION INC.

JR LIVESTOCK CONSULTANTS LTD.

ASSAY REPORTING SHEET
MYCOTOXIN
Fungal Source, Metabolite

	Reported Values		Reported Values		Reported Values		Reported Values	
	ppm	ppb	ppm	ppb	ppm	ppb	ppm	ppb
	AFLATOXIN Aspergillus flavus - Aflatoxin B ₁ , B ₂ , G ₁ , G ₂							
FUMONISINS Fusarium moniliforme - Fumonisin, Fusaric acid								
OCHRATOXIN A Aspergillus ochraceus;catum - Ochratoxin A								
TRICOTHECENES, T-2 Aspergillus flavus - B ₁ , B ₂ , G ₁ , G ₂								
VOMITOXIN Fusarium graminearum - Deoxynivalenol (DON, Vomitoxin)								
ZEARALENONE Fusarium roseum - Zearalenone								
ERGOT ALKALOIDS Claviceps purpurea - Ergotoxin								
MOLD - COLONY FORMING UNITS (CFU/g) or (CFU/ml)								
MOISTURE CONTENT								

Converting ppb to ppm → Move the decimal 3 spots to the left
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1 ppb = 0.001ppm
1 ppm = 1000 ppb
ppm are the same as mg/kg

TOLERABLE LIMITS BY STAGE OF LIFE

SWINE/POULTRY APPLICABLE

		BREEDING STOCK/LAYERS		NURSERY/BROODER		GROW FINISH	
		Low Risk	High Risk	Low Risk	High Risk	Low Risk	High Risk
AFLATOXIN	ppm	0.02-0.10	>0.10	0.02-0.10	>0.10	0.02-0.10	>0.10
FUMONISINS	ppm	1.50-4.0	>4.0	1.50-4.0	>4.0	2.0-5.0	>5.0
OCHRATOXIN A	ppm	0.05-0.40	>0.40	0.05-0.4	>0.40	0.08-0.5	>0.50
TRICOTHECENES, T-2	ppm	0.10-0.40	>0.40	0.05-0.10	>0.10	0.15-0.4	>0.40
VOMITOXIN, DON	ppm	0.20-0.90	>0.90	0.15-0.20	>0.20	0.25-1.0	>1.0
ZEARALENONE	ppm	0.05-0.25	>0.25	0.05-0.25	>0.25	0.10-0.25	>0.25
ERGOT ALKALOIDS	ppm	0.20-0.90	0.90	0.20-0.90	0.90	0.80-5.0	>5.0
MOLD	cfu/gm	>5,000		>5,000		>30,000	

MOLD IDENTIFICATION TABLE

MOLD SPECIES	COLOUR	TOXIN PRODUCER	COMMENTS
PENICILIUM	Blue/Green	Yes	Several potent toxins associated with certain species, most common toxin producer in silage
ASPERGILLUS	Yellow Green	Yes, Aflatoxin	Found in drought heat stressed conditions or insect infected fields
FUSARIUM	Red/White/Pink	Yes, Zearalenone, Vomitoxin, T-2 Toxin, Fumonsins	Common in cold wet seasons, certain strains produce extremely potent toxins
MUCOR	White	No	Found especially in sealed corn
RHIZOPUS	Black	No	Requires high moisture & an advanced decay mold
CLADOSPORIDIUM	White	No	Symptoms similar to yeast, grows at low temps.

MAJOR EFFECTS OF MYCOTOXINS ON SWINE PERFORMANCE

MYCOTOXIN	PRIMARY EFFECT	STAGE AFFECTED	CLINICAL SIGNS	
Deoxynivalenol (DON, vomitoxin)	Affects serotonin receptors and cytokine production	All stages (younger pigs may be more susceptible)	- Reduced ADFI and ADG ^{1,2} - Vomiting ² - Diarrhea (soft or watery feces) ³	- Reduced immune function ³ - Mild changes to kidney, thyroid, blood ⁴
Aflatoxins	Mutagenic and carcinogenic	All stages	- Reduced ADFI and ADG ⁵ , - Reduced hair production ⁵ - Lethargy ⁶ - Ataxia (lack of coordination) ⁶	- Rough hair coat ⁶ - Hemorrhage ⁶ - Fatty Liver ⁶
Zearalenone	Estrogenic	Pre-pubertal, sows and pre-pubertal boars	- Swelling and reddening of the vulva ⁷ - Vaginal and/or rectal prolapse ⁷ - Anestrus ⁸ - Reduced litter size ⁸	- Fetal resorption ⁸ - Implantation failure ⁸ - Decreased libido and testosterone ⁹ - Feminization ⁹
Ochratoxin A	Disrupts phenylalanine (an amino acid) metabolism	All stages	- Kidney damage ¹⁰ - Decreased ADFI and ADG ¹¹	- Immunosuppression, increased risk of infection ¹²
Fumonisin	Disrupts lipid metabolism	All stages, especially young pigs	- Pulmonary edema ³ - Reduced immunity ³ - Decreased ADFI and ADG ¹³	- Shortness of breath ³ - Weakness ³ - Cyanosis (blue/purple colour of skin/membranes) ³
T-2 and HT-2 Toxins	Inhibits protein synthesis	All stages	- Unthriftiness ⁶ - Low ADFI and ADG ⁶ - Reproductive failure	- Gastric upset (diarrhea) ⁶ - Cellular necrosis ⁶ - Immunosuppression
Ergot Alkaloids	Neurological	All stages, especially the reproductive herd	- Lameness ¹⁴ - Gangrene ¹⁴ - Decreased ADG ¹⁴	- Abortion ¹⁴ - Agalactia (absence of milk production) ¹⁴ - Ataxia ¹⁴

¹ Decreased ADFI and feed refusals have been shown at levels as low as 0.5-1 ppm (Smith et al., 2005)

² >2-5 ppm is for decreased ADFI and ADG, vomiting and complete feed refusal >20 ppm (Haschek et al., 2002)

³ Pierce and Diaz, 2014 ⁴ JECFA, 2001 ⁵ Nibbelink, 1986 ⁶ Whitlow et al., 2014 ⁷ Friend et al., 1990

⁸ Smith et al., 2005 ⁹ Osweiler, 1986 ¹⁰ Kidney damage occurs at levels as low as 0.5 ppm (Lippold et al., 1992)

¹¹ Performance is affected at levels of 2 ppm or greater (Lippold et al., 1992; Stoev et al., 2000)

¹² Can occur when levels >2 ppm are fed for longer periods of time (Harvey et al., 1992)

¹³ ADG reduced by 11% when 10 ppm fumonisin B₁ wasterter pegs for 8 weeks (Rotter et al., 1996) ¹⁴ Strickland et al., 2011

FIELD NOTES

