



# FORAGE LAB AUSTRALIA

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## UNDERSTANDING YEAST & MOULD COUNT NUMBERS

Moulds, yeasts and mycotoxins are all around us, and commonly in the feeds we offer our animals. One of the many great things about ruminants, is that protozoa, fungi and bacteria in the rumen can deactivate base levels of challenges presented from moulds and mycotoxins. Cattle can therefore utilise feeds which may be otherwise inedible to other species.

Testing confirms that in any diet, even fresh pasture, there is a reasonable likelihood of a presence of yeasts, moulds and mycotoxins.

While high levels of all 3 can drop overall feed intake, of the 3, mycotoxins are the ones most likely to cause direct harm to the animal.

There are a number of different mycotoxins, each requiring a separate test to determine both their presence and the level in a given feed. As such, testing for overall mould and yeasts is faster, cheaper, and often, the given environmental conditions and type of forage can give a good indication of the type of mycotoxin that may be present.

### Yeasts

While not of themselves harmful (other than DMI effect), raised yeast counts indicate aerobic spoilage has begun, and that mould counts are also likely to raise, bringing greater toxin risk. As a general guide, dry hay and grain should be less than 1 million CFU, and silages no higher than 4-5 million.

### Moulds

Moulds (also called fungi), are the ones that actually produce mycotoxins, thus their levels are indicative of the potential risk. Table 1 shows the likelihood a given feed may be a source of a mycotoxin challenge, and offers an encouraged action. It should be noted that clinical signs may still occur at lower levels.

**Table 1. Mould CFU count and relative risk**

10 – 10,000	Relatively safe
10,000 – 100,000	Transition zone
100,000 – 500,000	Relatively safe – watch for clinical signs, consider feed management options
500,000 to 1 million	Discount nutrient value by 5%, feed with caution,
1 million to 5 million	Dilute feed, and include feed management options
Over 5 million	Avoid feeding
Over 10 million	DO NOT FEED

Adapted from Hoffman(2009), Adams(2013) & Penn State Extension

The colour of a given mould can also give some indication as to the potential type of mould, although using colour as a sole guide is dangerous.

White mould for example can be harmless, and not a producer of Mycotoxins, or alternatively, can be a fusarium, of which certain strains produce extremely potent toxins. The old story that white moulds are safe is not true

As such, use the colour guide as detailed in Table 2 as a guide only, do not rely on colour as your sole measure.

**Table 2. Major Classes of Fungi and related Mycotoxin groups**

MOLD	COLOR	TOXIN PRODUCER	COMMENTS
Penicillium	Green to green-blue	Yes - Ochratoxin, Citrinin, Patulin	Several potential toxins associated with certain species. Most common toxin producer in silage.
Aspergillus	Yellow-green	Yes - Aflatoxin, Ochratoxin	Found in drought, heat-stressed conditions or insect infested fields.
Fusarium	White to pinkish - white	Yes- Zearalenone, Vomitoxin (DON), T-2 Toxin, Fumonisin	Common in cold, wet seasons. Certain strains produce extremely potent toxins.
Mucor	White / Grey	None	Found especially in sealed corn. Grows at low temperatures. Also found in manures and soils.
Rhizopus	Black/white	None	Requires high moisture and an advanced decay mould. Common bread mould.
Cladosporium	White	None	Produces yeast-like symptoms. Grows at low temperatures.

Mahanna (2004)

In Southern Australia, we typically see a lot of fusarium, particularly through winter and cool Autumn and Spring seasons. Aspergillus producing particularly Aflatoxin, is more common in Southern summer and year-round in Northern Australia.

### **Toxin assay levels**

If a problem occurs that we already know may relate to visually spoiled feedstuffs, we may choose to do a mycotoxin assay directly, rather than do a mould and yeast count. Interpretation levels are shown in below.

**Table 3. Mycotoxin risk levels in Cattle**

		Dairy	Beef
Aflatoxin	Low	<20ppb	<5ppb
	Moderate	20-100ppb	5-10ppb
	High	>100ppb	>20ppb
Zearalenone	Low		<1000ppb
	Moderate		1000-5500ppb
	High		>6000ppb
Vomitoxin	Low		<1ppm
	Moderate		1-6 ppm
	High		> 6ppm
T-2	Low		<150ppb
	Moderate		150-500ppb
	High		>500ppb

### **Toxin management tools**

With regard to feed additives as a management tool for mycotoxins, simple binders are effective against Aspergillus type toxins, but significantly less so on some Fusarium produced toxins. Products that combine toxin binding action together with toxin deactivation action (such as Elitox) are effective against wider varieties of Mycotoxins.