



# Market Requirement Information Package

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## Mycotoxin Standards

### Introduction

Mycotoxins can be produced by certain moulds growing in maize. Mycotoxins cause disease in humans, companion animals and livestock, and are domestically and internationally regulated.

Australia exports about \$11 million of maize each year, compared to a total production worth about \$77 million. Australian maize is generally of high quality in regard to mycotoxins by comparison with maize produced in other countries, yet there have been recent trade problems when containers of maize failed to meet the quality standards expected for aflatoxin upon arrival at destination. Whether the contamination occurred at source or during transport is not clear, but many factors could have contributed. Domestic end-users of maize are also concerned about the risks to their enterprises from mycotoxins.

It is desirable that a consistent and coordinated approach is taken to detect contaminated maize and ensure that it is diverted away from human food and sensitive markets but this is difficult with production and marketing spread among many different groups and regions. Some sections of the industry regularly test maize for mycotoxins, but other sections are unaware of the potential problem, leaving the industry vulnerable to incidents of contamination.

Accordingly, the Maize Association of Australia has established a set of protocols to guide all participants in the maize supply chain, including potential maize exporters, in order to minimise the risks.

### Aflotoxins

Which mycotoxins are of concern, and what is the standard that needs to be met? Aflatoxins are most important. Standards can refer only to aflatoxin B1, or to total aflatoxins (B1+B2+G1+G2). A common limit is <0.005 mg total aflatoxins/kg for human food, and this is the industry standard for milling maize in Australia.

There is no Australian standard for aflatoxins in maize, but these must be 'As Low As is Reasonably Achievable' (the ALARA principle). The ALARA principle recognises the difficulties in trying to ensure that all maize is entirely free of aflatoxins (even though Australian maize is generally of better quality than that produced in other countries, because of fewer storage problems).

The effects of processing also must be considered in deciding which standard to apply. Grits contain less aflatoxin than feed maize, since aflatoxin tends to be concentrated in the surface layers of the grain. Aflatoxin is not oil-soluble, so maize oil does not have problems. Aflatoxins can be



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associated with protein, so gluten can have somewhat higher concentrations than the source maize, but maize products used as thickeners or additives are substantially diluted in the final product. Baking processes also cause some reductions. All this should be taken into account in the risk assessment. It is proposed that in many cases, the Prime maize standard of 0.015 mg aflatoxins/kg is perfectly adequate for raw maize ingredient.

Maize for stockfeed is allowed to contain up to 0.05 mg/kg aflatoxin B1 under Queensland Regulations and the maize industry has set limits for various maize grades. These regulations are soundly based on known tolerances of different animal species to aflatoxin, and it would be economically unwise to apply unnecessarily stringent limits to feed maize with the additional costs inevitably involved.

For export, mycotoxin standards vary between countries, and import regulations often allow little room for negotiation. Aflatoxins are most widely regulated, at limits ranging from 0.005 to 0.02 mg aflatoxins/kg. The specific regulations that apply in that country for imported grain must be clarified in consultation with the importer. An importing country might apply the human standard regardless of intended use because of local regulations.

### **Fumonisin**

Fumonisin are moderately common in maize in most countries, but not yet widely regulated. A limit of 2 mg fumonisin/kg is the industry standard for milling maize in Australia, and although 1 mg/kg has been discussed in some trade forums, lower limits appear unlikely to be applied by our trading partners at present.

### **Zearalenone, nivalenol and deoxynivalenol**

Zearalenone, nivalenol and deoxynivalenol are quite uncommon in Australian maize, except in a few coastal regions of southern Qld, northern NSW and the tablelands of far north Qld. They are not internationally regulated, but 1 mg/kg is the most stringent advisory standard in the USA, with higher concentrations accepted for tolerant classes of livestock. A lower limit than this would be difficult for an importing country to justify.

### **Ochratoxin A**

Ochratoxin A is regulated in grain in a few countries like the EC and Canada, but is rare in Australian maize without storage problems. It is not currently regulated domestically or internationally but 0.005 mg/kg is being considered.



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### Other

A few other mycotoxins (cyclopiazonic acid, citrinin, moniliformin, T2-toxin) have been detected in maize elsewhere, but there are no indications that these are significant in Australian maize.