

ADVISORY COMMITTEE ON ANIMAL FEEDINGSTUFFS

28th Meeting of ACAF on 8 February 2005

Discussion Paper

MYCOTOXINS

Action required: Following Dr. Ray Smith's presentation the Committee is invited to discuss and consider any relevant follow-up action.

Secretariat January 2005

MYCOTOXINS

Purpose

1. At its last meeting on 30 November 2004, a member of the Committee asked for information concerning the effects of feed mycotoxins on livestock and consumers of animal-derived feed. It is hoped that the presentation will help satisfy this request. Copies of the slides to be used in the presentation are attached.
2. Members are invited to discuss and consider any relevant follow-up action.

**ACAF Secretariat
Food Standards Agency
January 2005**

Mycotoxins in Feed - implications for
the Consumer and the Farmer

- What are mycotoxins?
- How do they get into animal feed?
- What types of mycotoxins are there?
- What legislation controls the presence of these substances in feed?
- What are the consequences for the presence of mycotoxins in feed?

Mycotoxins in Feed - implications for
the Consumer and the Farmer - 2

- What data do the FSA have on the occurrence of mycotoxins in feed?
- What role has the European Food Safety Authority played?
- What future controls are likely?
- What can be done to limit the levels and impact of feed mycotoxins?

What are mycotoxins?

- They are secondary metabolites produced by moulds, sometimes in response to a 'stressful' environment.
- Ingestion or other contact may evoke a response in humans and/or animals.
- In a single sample of feed, more than one mycotoxin may be present.
- Undiscovered mycotoxins?

How do these get into animal feed?

- Mould started to grow on feed component (e.g. grains) pre-harvest - 'field mycotoxins'.
- Mould started to grow on feed post-harvest - 'storage mycotoxins'.
- Toxin already present in commodity derived from food processing or waste food.

Storage Mycotoxins

- These can be produced where feeds are stored without adequate drying, or where they get wet during the storage period.
- Distribution of such mycotoxins in stored feed can be highly heterogeneous.
- For example, ochratoxin A (OA) can be produced by *Penicillium verrucosum* (this mould can also produce citrinin).

Field Mycotoxins

- *Fusarium* and *Alternaria spp.* can grow and produce mycotoxins in grains while still in the field, especially when wet weather is encountered prior to harvest (i.e. at the time of flowering).

What legislation controls the presence of these substances in feed?

- The Undesirable Substances in Feed Directive (2002/32) contains maximum permitted levels (MPLs) for aflatoxin B₁ (AFB₁). This Directive is implemented here by The Feeding Stuffs Regulations.
- So far, there are no other MPLs for mycotoxins in feed.

What are the consequences for the presence of mycotoxins in feed?

- **For the consumer** - the main risk appears to be AFB₁ in feed for dairy animals. It is converted *in vivo* to AFM₁, which is found in the milk. There is also a risk of OA being transferred to eggs and offal. Most other 'common' mycotoxins e.g. deoxynivalenol (DON) are not likely to be transferred to animal produce to a significant extent.

What are the consequences for the presence of mycotoxins in feed? contd

- **For the consumer** - significant levels of mycotoxins in animal feed might also have a significant effect on the price of animal produce and its availability.

What are the consequences for the presence of mycotoxins in feed? contd

- For livestock - these are susceptible to varying degrees to mycotoxins in feed.
- Pigs seem to be particularly sensitive to DON and zearalenone (ZEN).

What are the consequences for the presence of mycotoxins in feed? contd

- ZEN - a *Fusarium* 'field' mycotoxin.
- Interacts with oestrogen receptors, can lead to reduced fertility.
- Ruminants and poultry seem to be tolerant, pigs most sensitive livestock species.
- Broken down *in vivo*.

What are the consequences for the presence of mycotoxins in feed? contd

- DON - a *Fusarium* field mycotoxin.
- Presence in feed can lead to loss of appetite, vomiting and slow rate of growth.
- Not believed to be genotoxic, or teratogenic.
- Pigs most sensitive livestock species.
- Rapidly broken down *in vivo*.

What are the consequences for the presence of mycotoxins in feed? contd

- OA - a storage mycotoxin from *Aspergillus*, *Penicillium spp.*
- Can be present in cereals, plus imported feed materials, e.g. soyabeans and peanuts.
- A renal toxin - pigs and poultry are particularly sensitive. PDNS, PMWS?
- Immunotoxic, teratogenic and possible carcinogen.

What data do the FSA have on occurrence in feed?

- Some data available pre-2000 (MAFF) and for food-grade grains.
- Most recent data from 2001/2 programme of sampling and analysis by GB trading standards offices.
- Samples were analysed for aflatoxins, OA and ZEN.

What data do the FSA have on occurrence in feed?

- **Aflatoxins** - Total AF, AFB₁, AFB₂, AFG₁, AFG₂ data available. Generally, low only levels of aflatoxins were found. There was only a low rate of samples exceeding the MPL for AFB₁.
- **ZEN** - most samples were below the limit of determination, otherwise only low levels were generally found.

What data do the FSA have on occurrence in feed?

- OA - most samples were below the limit of determination, otherwise only very low levels were generally found.

What role has EFSA played?

- EFSA has undertaken a series of risk assessments on mycotoxins in feed for:
- AFB₁ (February 2004)
- ZEN (July 2004)
- DON (June 2004)
- OA (September 2004)

What future controls are likely?

- AFB₁ - new concern - high-yielding cows. New or revised MPLs are unlikely for now.
- ZEN - EFSA identified few significant risks for the consumer. MPLs or action levels possible for reasons of animal welfare.
- DON - as for ZEN.
- OA - some carry-over to eggs and offal. MPLs or action levels probable.

What can be done to limit the levels and impact of feed mycotoxins?

- Advice to farmers and others - storage, transport and processing improvements.
- Observance of statutory and advisory levels.
- Detoxification/binding processes e.g. use of ammonia to reduce levels of AFB₁.
- Increased checks and surveillance.
- Consideration of sensitive species.
