INVITATION TO TENDER

Mycotoxin contamination: assessment of risk in livestock systems

BPEX, EBLEX and HGCA invite you to submit applications for the following tender.

Your bid should be sent electronically to Sue Wickham at BPEX Sue.Wickham@bpex.ahdb.org.uk no later than 4.00pm on 28th February 2014.

Tender outline:

Three-stage, desk-based research project, to be carried out by a consortium of researchers with experience of both mycotoxins and livestock.

The review should cover the following:

1. A review of methods for testing mycotoxin types and levels in animal products, feed, forage, straw and live animals. This must take into account:
   a. The merits and drawbacks of the different types of tests
   b. Tests used commercially both in the UK and internationally
   c. Optimum time of testing (relative to harvest/life cycle of mycotoxins)
   d. Accuracy and reliability of tests (sensitivity and specificity)
   e. Availability & cost of feed, forage & straw testing services
   f. Availability and cost of diagnostic animal-based tests, e.g. blood tests
   g. Commercial testing laboratories in the UK

2. Potential effects:
   a. Species-specific indicators for chronic & acute exposure (health, behaviour and productivity).
   b. Tolerance levels for mycotoxins according to species (beef cattle, dairy cattle, pigs) and class of stock (young, mature- lactating, mature-dry, finishing)
   c. Mycotoxin interactions/synergistic effects of the presence of multiple mycotoxins

3. Prevention:
   a. Risk assessment on the impact of management practices (e.g. storage etc) on levels of mycotoxins, which must take into account all routes of exposure (e.g. ingesting and inhaling)
   b. Mitigation measures
   c. The spectrum of commercial binders on the market, evidence of their efficacy and pros and cons of their use.
Authors are expected to draw upon the peer-reviewed and grey literature as needed. Use of anecdotal evidence is acceptable where necessary but must be acknowledged accordingly, contrasting case studies would add value in this respect.

Output:
- Final project report with clear conclusions and recommendations to industry to mitigate the risk to livestock from mycotoxin exposure. The report will be published on AHDB websites.
- Manuscript for publication in peer-reviewed journal
- 1-page key recommendations for farmers (per livestock species)

Overall aims:

1. Determine the severity of the problem in the UK
2. Highlight research gaps
3. Formulate mitigation advice for farmers
4. Collate evidence for regulatory processes

The tenders submitted in response to this call will be judged on the following criteria:
1. Information provided in the application
2. Strength of the research team
3. Experience in the research field
4. Track record of delivering research projects on time and against objectives
5. Cost

The contract will be awarded to the most advantageous tender, based on a combination of price, quality of the proposal and relevant technical knowledge, expertise and track record in this area. The study is expected to last approximately four months from the contract start-date.

AHDB standard contractual terms will apply.

Please email any questions or queries, to Sue Wickham:
sue.wickham@bpex.ahdb.org.uk
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Background

Mycotoxins are fungal derivatives that can be present on grain, grass, conserved forage and even dust. It is suggested that there are 300 - 600 different types of mycotoxins, but an exact number remains to be determined as new fungal metabolites are still emerging (Fink-Gremmels 2008). Several risk factors increase likelihood of mycotoxins and mycotoxicosis (disease in animals caused by mycotoxin ingestion), including high rainfall at flowering and during pre-harvest (see HGCA risk assessment tools www.hgca.com), hence wet summers such as 2012 result in high mycotoxin levels in grain (HGCA 2012).

Legal requirements

Although there is compulsory testing and limits for grain destined for human consumption, there are no legal requirements for livestock feed. The EU guidelines suggest maximum limits for fusarium mycotoxins – deoxynivalenol, (DON) and zearalenone (ZON) – for feed grains and complete feeds, but this does not cover the broad spectrum of mycotoxins nor is it applicable to straw and other forages. Yet, recent research has been reported to show that higher concentrations of mycotoxins can occur in straw than the associated grain samples (e.g. (Edwards and Stewart 2010)) and silage represents a significant source of mycotoxins, for which there is comparatively little research (Driehuis et al. 2008).

Mycotoxiosis

The severity of mycotoxiosis depends on the mycotoxin type, animal health and stage of production and dose eaten. Some types damage organs directly (e.g. liver, rumen), whilst others impair reproduction or cause cancer (Bryden 2012). Physical effects range from performance loss to mortality. Different mycotoxins can interact in the rumen to exacerbate the effect and some are known to suppress immune function (Fink-Gremmels 2008).

Due to the resilient microorganism diversity in the rumen, ruminants can withstand the effects of mycotoxins better than monogastrics, but this capacity may be compromised during times of stress (e.g. diet change, disease) (Fink-Gremmels 2008). Various research studies have proposed guideline tolerance levels for different species and classes of stock (Munkvold 1997), but it is unknown how reliable these guidelines are. Plus, they would need to account for confounding factors such as stress and the presence of multiple mycotoxins.
Commercial binders

Various commercial binders are available to alleviate the effects of mycotoxiosis. It is claimed that they bind to the toxin with the binder-toxin combination being excreted without causing harm. However, if the mycotoxin migrates across the gut wall quickly, this may reduce the likelihood of binder success, a particular logistical issue with forages. Additionally, we need to gain a better understanding of any unintended consequences that these binders may cause and the efficacy of different types.

We require more information to be able to provide independent advice for farmers on the prevalence of mycotoxins, risk factors and mitigation.

References


