

ANALYSIS OF MYCOTOXINS IN FEEDS – A SHORT DISCUSSION

Suhaimi, D.¹, Wan Syahidah, H.¹, Lily Suhaida, M.S.² & Terjuddin, G.¹

¹Veterinary Public Health Laboratory, Department of Veterinary Services, Bandar Baru Salak Tinggi,
43900 Sepang, Selangor

²Veterinary Research Institute, 59, Jalan Azlan Shah, 31400 Ipoh, Perak

E-mail: suhaimidollah@dvs.gov.my

Abstract: Studies on a wide variety of agricultural products indicate that, especially for small sample sizes, the sampling step is usually the largest source of variability associated with the mycotoxins' test procedure. In research, quality assurance, and regulatory activities, correct decisions concerning the fate of commercial lots can only be made if the mycotoxins concentration in the lot can be determined with a high degree of accuracy and precision. According to the mycotoxin data base (2005-2009) of Veterinary Public Health Laboratory, DVS showed that there was a significant increase (51%) of aflatoxin detections in feed samples for the year 2008. This increase has led the laboratory to investigate further the quality assurance aspect of its analysis. All other relevant factors involved should be well addressed equally. On the other hand, storage conditions, sampling and packaging of feeds should be properly followed for the purpose of analysis. They could give rise to a biased interpretation of the mycotoxins' occurrence and incorrect decision made by traders on some important commodities.

Keywords: analysis, mycotoxins, feeds

INTRODUCTION

Mycotoxins are toxic and/or carcinogenic compounds produced by various fungal species that grow on various agricultural commodities. These commodities can be contaminated either in the field or in storage. Many countries regulate the maximum level that can occur in food and feeds. Most regulations are concerned with controlling aflatoxin because it is considered the most toxic and carcinogenic of the naturally occurring mycotoxins. However, maximum levels differ widely from country to country because of a lack of agreement on what constitutes a safe maximum level for humans. It is important to be able to detect and quantify the mycotoxin concentration in food and feeds destined for human and animal consumption. Correct decisions concerning the fate of commercial lots can only be made if the mycotoxin concentration in the lots can be determined with a high degree of accuracy and precision.

DISCUSSION

Even with the best quality-control systems, animal producers often find themselves having mycotoxin-contaminated grain or feeds. The question then arises: "Is the level of mycotoxins present safe to feed to the animals?" Prior to giving specific information, some general concepts regarding the effect of mycotoxins on animals must be understood. Among the factors to be determined are : chemical class and chemical structure of the mycotoxin in question, presence of other mycotoxins, species and health status of the animal involved, criteria by which effects are determined, number of animals involved in judging the no-effects level, sampling and assay procedures, and length of time animals are exposed to the mycotoxins. Based on the mycotoxin data base (2005-2009) of Veterinary Public Health Laboratory, DVS, there was a significant increase (51%) of aflatoxin detection in by-product feeds for the year 2008. What were the factors that contributed to this occurrence? A preliminary study to compare the effect of different storage conditions for a certain period of time on a variety of feed samples conducted by this laboratory showed that there were some errors in their screening results. The focus of this discussion is to look into the aspect of sampling and assay procedures because it is imperative that these procedures are accurate, since the results are the basis for deciding whether or not to use a given lot of feed or feed ingredient. Since mycotoxins are not evenly distributed in grain or mixed feeds, it will be difficult to get any meaningful results in mycotoxin analyses from the act of taking a feed or grain sample. It is said that nearly 90% of the error associated with mycotoxin assays can be attributed to how the original sample was collected. Moisture is the most important factor in determining if and how rapidly molds will grow in feeds. Moisture in feeds come from three sources : (1) feed ingredients, (2) feed

manufacturing process, and (3) the environment in which the feed is stored. There is always some level of uncertainty associated with sampling plan. Therefore the true mycotoxin concentration of a bulk lot cannot be determined with 100% certainty; nor can all lots be correctly classified into good and bad categories with 100% accuracy. Bias and variability are two types of uncertainties associated with a sampling plan. Even when using accepted sampling, sample preparation, and analytical procedures, there are errors associated with each of these steps of the mycotoxin test procedure.

CONCLUSION

The sampling, sample preparation, and analytical steps of the mycotoxin test procedure contribute to the variability of mycotoxin test results. It is generally suggested that to achieve a more precise estimate of the true lot concentration is to reduce the total variability of the test procedure i.e by reducing the variability associated with each step involved.

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SINOPSIS

Mikotoksin adalah sejenis racun atau toksin yang terhasil daripada kulat. Ia terdapat pada makanan dan hasil pertanian yang tidak dijaga atau tidak disimpan dengan baik. Disebabkan kebimbangan terhadap bahaya mikotoksin, kebanyakan negara telah menetapkan peraturan mengenai had toleran mikotoksin dalam makanan dan hasil pertanian. Ini termasuklah hasil pertanian bagi kegunaan haiwan. Walau bagaimanapun, tahap toleran bagi mikotoksin adalah berbeza antara negara -negara kerana kekurangan persetujuan mengenai tahap toleran yang selamat bagi manusia. Mengikut pelbagai kajian terhadap kontaminan mikotoksin daripada hasil pertanian, persampelan yang betul memainkan peranan yang penting dalam analisis mikotoksin. Ia bertujuan memastikan laporan analisis mikotoksin yang dikeluarkan adalah tepat dan boleh dipercayai. Merujuk kepada data analisis mikotoksin (2005-2009) Makmal Kesihatan Awam Veterinar, Jabatan Perkhidmatan Haiwan, didapati berlakunya peningkatan yang ketara (51%) terhadap kontaminan mikotoksin bagi tahun 2008. Sehubungan itu satu kajian perlu dilakukan daripada pelbagai aspek termasuk kaedah penyimpanan, persampelan dan pembungkusan sebelum dan selepas sampel dihantar ke makmal untuk analisis mikotoksin. Ini untuk memastikan gambaran berlakunya kes-kes mikotoksin adalah boleh dipercayai dandidak disalahtafsir terutama dalam perdagangan komoditi pertanian.