Using monitoring data to find trends: case study mycotoxins in animal feed

Paulien Adamse, Stefanie Schoss, Monique de Nijs, Harry van Egmond, Jaap Driessen, Theo de Rijk, Jacob de Jong

Background

Safe feed is the starting point for safe food, since consumption of contaminated animal products can expose humans to undesirable substances as well. The regulatory limits for contaminants in feed are laid down in Commission Directive 2002/32/EC.

Regulation (EC) no 882/2004 obligates each EU member state to draw up their own multi-annual control programme (National Plan). The types of feed and feed ingredients that are sampled can vary per year and per country.

Monitoring stages

Feed producing companies have strict control programs to prevent contamination (Figure 1). The Competent Authorities (e.g. NVWA) design the National Plan (NP) to monitor the effectiveness and compliance to regulations of the safety control programs of the industry.

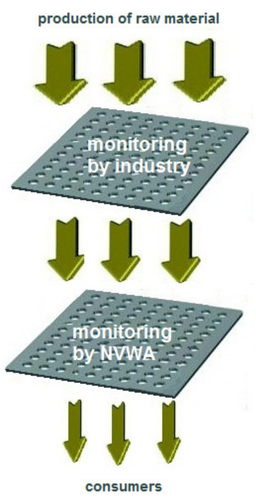

Figure 1. Monitoring of feed safety in several stages of the feed chain

Designing the National Plan

A risk based approach is prescribed in Regulation (EC) no 882/2004 and used to choose the target feeds. To determine the focus and direction of the National Plan many resources are used as input (Figure 2).

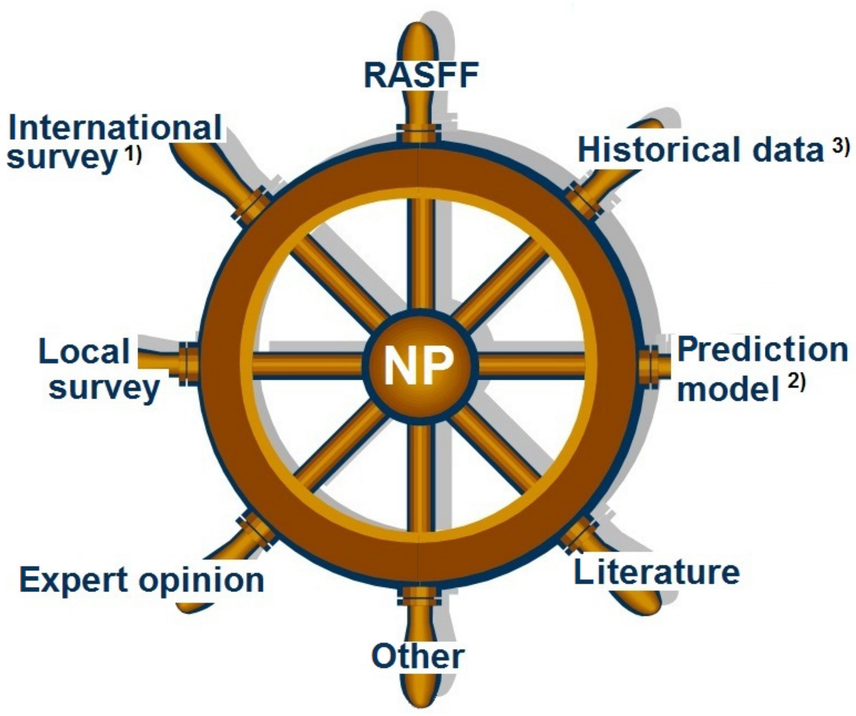

Figure 2. Input for fine-tuning of risk based national monitoring plans

Analysing historical data

Historical data from the Netherlands National Plan Animal Feed (NP) have been used to detect trends in contamination of feed and feed ingredients. The presence or absence of trends (increase or decrease of contaminant-concentrations over a certain period of time) as well as the closeness of levels to the regulatory limits or guidance values is input for fine-tuning the next NP.

Examples of trends in concentrations of mycotoxins in animal feed (ingredients) are:

- DON in maize silage (Figure 3) – the R^2 value of 0.68 (> 0.3) indicates that the average DON concentration between 2002 and 2009 increases significantly. The 90th percentile values show the same trend.
- Fumonisin B1 + B2 in complete feed for pigs (Figure 4) - the average concentration increases significantly but remains low. The 90th percentile values show the same trend but this trend is not significant due to the large variation between years.

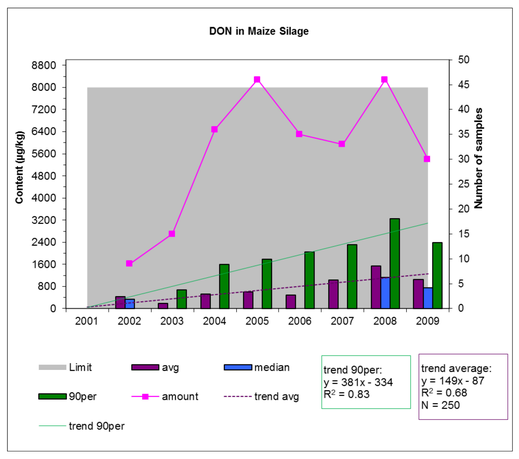

Figure 3. Deoxynivalenol content of maize silage: limit = 8000 µg/kg

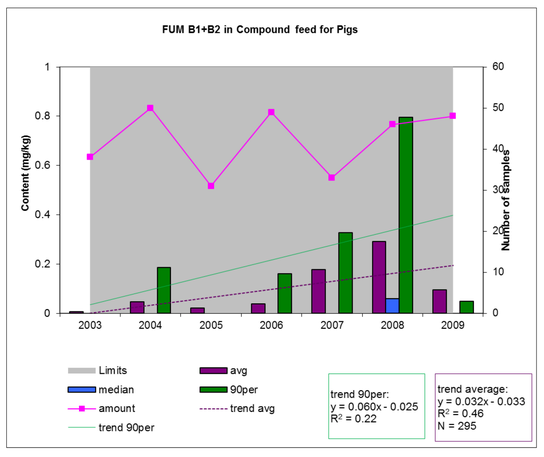

Figure 4. Fumonisin B1 + B2 content of complete feed for pigs ; guidance value = 5 mg/kg

Conclusions

- The design of the national feed control plan (NP) is the result of many sources of information.
- Trends in monitoring data can be used to fine-tune the NP.

References

1) da Silva, J. B., C. R. Pozzi, et al. (2000). Mycoflora and Occurrence of Aflatoxin B1 and Fumonisin B1 during Storage of Brazilian Sorghum. Journal of Agricultural and Food Chemistry 48(9): 4352-4356.
2) Van der Fels-Klerx, H.J., Burgers, S.L.G.E. and Booij, C.J.H. (2010) Descriptive modelling to predict deoxynivalenol in winter wheat in the Netherlands. Food additives & Contaminants: Part A: 27: 5, 636-643
3) Adamse, P., Egmond, H.J. van, Driessen, J., Rijk, T. de, Jong, J. de, Nijs, M. de (2011) Trend analysis of mycotoxins in animal feed RIKILT report 2011.017

Acknowledgements

This research was funded by the Netherlands Ministry of Economic Affairs, Agriculture and Innovation.

RIKILT Wageningen UR
P.O. Box 230, 6700 AE Wageningen
Contact: paulien.adamse@wur.nl
T + 31 (0)317 480269
www.wageningenUR.nl/rikilt