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A model for risk based safety control of feed ingredients

P. Bikker, A.W. Jongbloed, M. de Nijs, L.A.P. Hoogenboom, M.Y. Noordam, J. de Jong

RIKILT - Institute of Food Safety, Wageningen UR, PO Box 230, 6700 AE Wageningen, The Netherlands

E-mail: jacob.dejong@wur.nl

Abstract Introduction. According to EC directive 882/2004, member states are obliged to conduct official quality controls of animal feed ingredients on the basis of the risk for feed and food safety. In order to meet these requirements, a spread sheet model was developed to predict the contribution of individual feed ingredients to the risk for human and animal health related to specific contaminants, e.g. dioxins, aflatoxin B1 and DON.

Input. The input of the model includes the total annual production of compound feed for the major farm animal species (cattle, pigs, poultry), the total annual usage of locally produced and imported feed ingredients and the country of origin on the basis of (inter)national databases and information of feed industry organisations. For each feed ingredient and country of origin combination, the risk of substantial contamination is estimated (scale 0.01-1) for each contaminant based on trends in available analytical data and expert judgement including risk factors as climate, production process, quality control, etc. Finally, for each contaminant two toxicity factors, for animal health and human respectively are estimated for each animal category (e.g. broilers, laying hens, etc.) based on expert judgement of the direct toxicity for the target animal and the indirect risk for human health via consumption of the animal products.

Calculations. Least cost feed formulation was used to compose representative diets based on available ingredients for the major animal categories, e.g. weaned piglets, grower and finisher pigs, gestating and lactating sows. This allowed us to calculate the quantitative distribution of the total annual use of each ingredient among different animal species and categories. Subsequently, the total risk of each feed ingredient and country of origin combination for a specific contaminant was calculated based on the logarithm of the volume, the use of the feed ingredients for different target animals, the toxicity factors for animal and human health and the potential contamination for the country of origin.

Output. The model provides the relative contribution of each feed ingredient and country of origin combination to the total risk of a specific contaminant in animal feed, taking into account the volume of each ingredient and the use for different animal categories. Details can be provided, for example regarding risk for animal and human health.

Discussion. At present the model comprises information on dioxins, aflatoxin B1 and DON. It can be further optimized and easily extended to other toxic components and feed ingredients,

provided that information regarding their toxicity for target animals and human health and the risk of contamination in countries of origin can be obtained. The quality of the model predictions largely depends on the quality of the input data.

Conclusion. The presented model is a helpful tool to optimally allocate resources for (official) safety control of animal feed ingredients and to meet the requirements of EC directive 8822/2004.

Keywords risk based feed safety control;feed ingredients;contaminants;model