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WAGENINGEN UR

Quantitative assessment of the BSE risk from processing meat and bone meal in feed for non-ruminants in the Netherlands

C. J. de Vos, L. Heres

Introduction

- Total ban on use of MBM in livestock feed very successful in reducing BSE spread. But: waste of high quality proteins resulting in economic and ecological loss.
- BSE epidemic in the Netherlands is now on its return. Therefore, use of MBM derived from animals fit for human consumption, i.e. category 3 MBM, in feed for pigs and poultry reconsidered.

Aim

Assess the risk of new BSE infections in the Netherlands if category 3 MBM derived from cattle would be used in feed for non-ruminants.

Abbreviations

MBM = meat and bone meal
AIM = amount of infectious material
Non-ruminants = pigs and poultry
Incident = a non-detected BSE-infected cow of which infectious material ends up with calves

Method

Stochastic simulation model calculating:
- probability that infectious material of non-detected BSE cows ends up with calves;
- amount of infectious material (AIM) consumed by calves per incident;
- probability of ≥ 1 new BSE infection in case of an incident.

Main entity in the model is AIM (ID_{50}). All steps in the model are given in the flowchart of Fig. 1.

Pathways

(a) Cross-contamination in feed mill if both ruminant and non-ruminant feed are prepared at the same location (*feed mill*)
(b) Cross-contamination on primary farm if both dairy cattle and non-ruminants are present (*primary farm*)
(c) Contamination of grassland if manure of non-ruminants is applied as fertiliser (*grassland*)

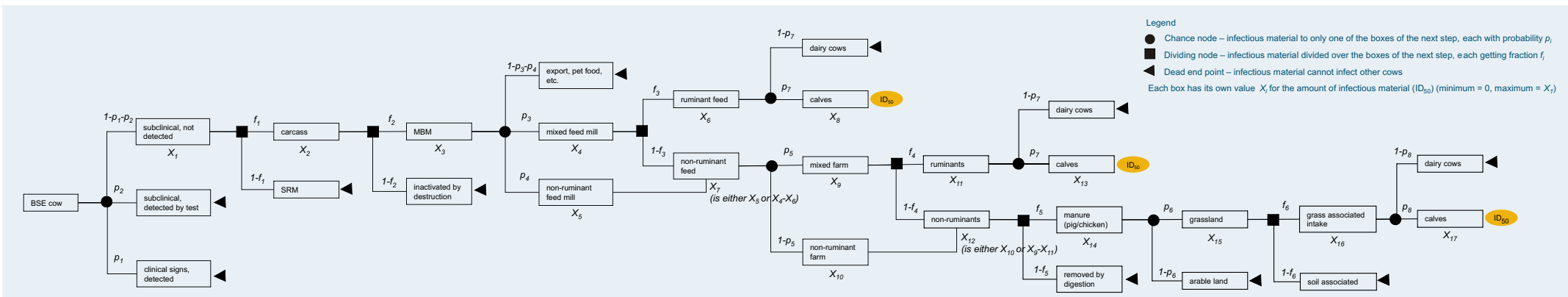

Fig. 1. Flowchart presenting the steps from BSE-infected cow to consumption of infectious material by calves.

Results

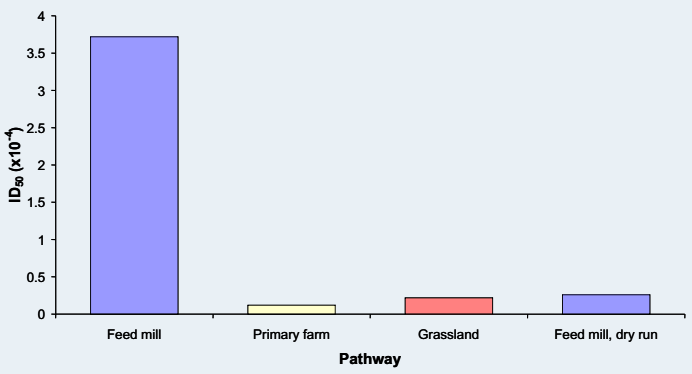

Fig. 2. Mean AIM per incident per pathway in the default scenario.

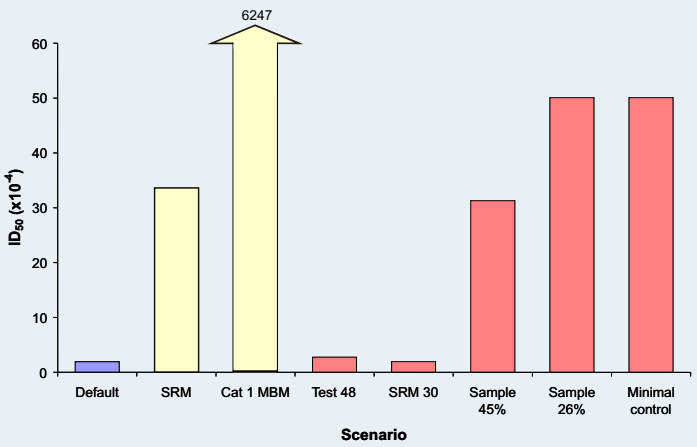

Fig. 3. Mean AIM per incident (overall) in the default, what-if, and future scenarios.

Scenarios

Default scenario
Aim: evaluate risk under current BSE legislation

What-if scenarios
Aim: evaluate risk if serious mistakes would be made in processing MBM
1. SRM not removed from carcass (*SRM*)
2. Category 1 MBM processed (*cat 1 MBM*)

Future scenarios
Aim: evaluate risk if other BSE control measures would be relaxed simultaneously
1. Minimum test age increased from 30 to 48 months (*test 48*)
2. Minimum age for SRM removal increased from 12 to 30 months (*SRM 30*)
3. Sample of cows tested to comply with OIE type A surveillance (*sample 45%*)
4. Sample of cows tested to comply with OIE type B surveillance (*sample 26%*)
5. Minimum BSE control by combining scenarios 1, 2, and 4 (*minimal control*)

Conclusions

- The overall probability that infectious material of a non-detected BSE cow ends up with calves is 3.2% for all scenarios.
- In the default scenario the AIM is extremely small in most incidents with a median value of 5.9×10^{-12} ID_{50}.
- The pathway feed mill is most risky based on the average AIM per incident. This pathway sometimes results in a relatively high AIM ending up with calves (maximum = 0.49 ID_{50}), although in most incidents the AIM is extremely small (median = 2.5×10^{-18}). This is the only pathway via which new BSE infections occur in the default calculations.
- Performance of a dry run before production of ruminant feed reduces the risk of this pathway to the risk level of the other pathways.
- Serious mistakes in processing MBM from cattle result in much higher doses of infectious material ending up with calves, especially if category 1 MBM would be processed.
- Only those future scenarios in which a sample of cows is tested result in an increase of the average AIM per incident. Then fully infectious BSE cows might be missed in the surveillance and their offal – after SRM removal – processed as category 3 MBM.
- Model results should be combined with BSE prevalence estimates to assess the overall risk of new BSE infections. For the Netherlands only a few BSE cases are expected in the coming years. We therefore conclude that the BSE risk of using category 3 MBM derived from Dutch cattle in feed for non-ruminants is very low.

Central Institute for Animal Disease Control (CIDC-Lelystad), Wageningen UR
Houtribweg 39, 8221 RA Lelystad,
P.O. Box 2004, 8203 AA Lelystad, The Netherlands
tel: +31 320 238 137
fax: +31 320 238 668
email: clazien.devos@wur.nl

2524 devos 2007 CIDC-Lelystad