

# PRELIMINARY STUDY OF MEAT AND BONE MEALS DETECTION IN FEEDSTUFFS IN BELGIUM

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## ABSTRACT

Bovine spongiform encephalopathy (BSE) belongs to the group of degenerative diseases affecting the central nervous system. The most likely cause of the BSE crisis is feeding cattle with meat and bone meals (MBM) contaminated by the resistant prion obtained by recycling ruminants' carcasses affected by transmissible spongiform encephalopathies. The 2000/766/EC decision established total feed ban for the first time. This decision consists in banishing the use of processed animal proteins for feeding animals raised for the production of food products. All the products or substances used for animal feeding are checked by the Federal Agency for the Safety of the Food Chain following a yearly planned sampling schedule. Controls concern both products meant for the Belgian market and exported products (intra-community exchanges and exports towards countries). The study and analysis of the samples obtained through the planned sampling schedule described above are the basis of this study. Different risk factors were highlighted in Belgium over the period between 2001 and 2004. These exploratory variables are the feed category, the feed origin and feed production companies.

## INTRODUCTION

Transmissible spongiform encephalopathies (TSE) represent a group of neurodegenerative diseases restricted to the central nervous system (CNS). Their evolution is slow and progressive but always leads to death. The most likely cause of BSE is the feeding of cattle with meat and bone meal contaminated by resistant prion obtained by recycling ruminants' carcasses [1]. The 2000/766/EC decision banished the use of processed animal proteins for feeding animals raised for the elaboration of food products [2]. To detect an accidental or deceitful contamination, optical microscopy is the official method [3]. All positive detections were recorded and analysed furthermore.

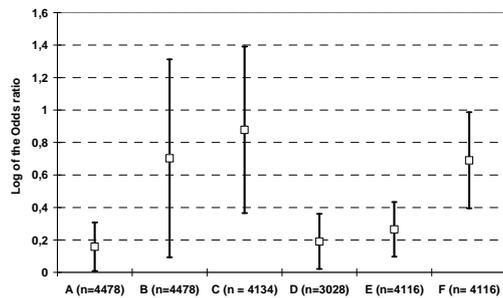
## MATERIALS AND METHODS

Data were obtained from the detection of MBM in the feedstuff database of the Federal Agency for the Safety of the Food Chain (FASFC) during four years (2001 to 2004). All traces found were considered positive results. Simple statistical materials were used in this preliminary study: they were odds ratio and a Grenier's adjustment [4], the p-value and exact Fisher test. First of all, the detection of MBM traces is exposed. Thereafter, the detection of fishmeal traces is shown because of their possibility to contain MBM traces.

## RESULTS

Exploratory variables were investigated: compound feed for non-ruminants appeared to be significantly at risk to detect mammal proteins' traces. The provinces of Antwerp and Eastern Flanders, the northern part of Belgium also presented also a significant risk to detect mammal proteins' traces. Since January 1st, 2001 fishmeal has been banished of ruminants feed because it is very difficult to detect the MBM it could contain. Nevertheless, fishmeal remains authorized as a raw material of non-ruminant feed.

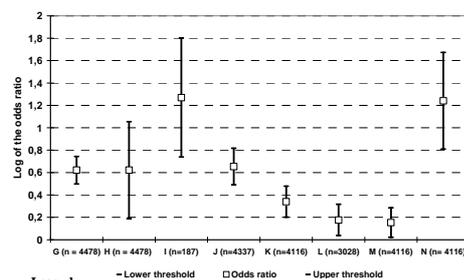
**Figure 1.** Exploratory variables showing a potential risk concerning the detection of traces of mammal meals in feedstuffs during 2001-2004 in Belgium (FASFC)



Legend: ■ : Log of the odds ratio (only those that were significant); - : upper and lower threshold;

- A : Compound feed for non-ruminant during 2001-2004;
- B : Compound feed during 2001-2004;
- C : Samples not identified about country of origin during 2001-2004;
- D : Antwerpen versus the northern part of Belgium during 2001-2004;
- E : Eastern Flanders versus others provinces of Belgium during 2001-2004;
- F : The northern part of Belgium versus the southern part during 2001-2004.

**Figure 2.** Exploratory variables showing a potential risk concerning the detection of traces of fishmeals in feedstuffs (from the point of view of possible cross contamination concerning ruminant feedstuffs) during 2001-2004 in Belgium (FASFC)



Legend: ■ : Odds ratio (only those that were significant); - upper and lower threshold;

- G : Compound feed for non-ruminant during 2001-2004;
- H : Compound feed during 2001-2004;
- I : Netherlands: compound feed for non-ruminant versus compound feed for ruminant during 2001-2004;
- J : Netherlands versus Belgium during 2001-2004;
- K : Antwerpen versus others provinces of Belgium during 2001-2004;
- L : Antwerpen versus the northern part of Belgium;
- M : Western Flanders versus others provinces of Belgium during 2001-2004;
- N : The northern part of Belgium versus the southern part during 2001-2004.

## DISCUSSION

This preliminary study proves that there are some exploratory variables which show some risk to detect mammal proteins' traces. Microscopic analysis detects fishmeal and MBM traces. Presence of fishmeal traces only is not a problem. But if fishmeal and MBM traces are found in compound feed, the problem is to find the origin of MBM. Presence of MBM traces in fishmeal would be a cross contamination or a deceitful contamination. Presence of fish scales fragments in non-ruminant feed suggests a cross contamination with fishmeal. It is interesting to study both types of traces simultaneously. Compound feed for non-ruminant during the period between 2001 and 2004 seems to be a potential risk both at the level of fishmeal traces (authorized) and of MBM traces. Fishmeal is authorized in pig and chicken feed and small proportions of MBM meals could be disseminated in this fishmeal [5]. Moreover MBM detection in fishmeal is very difficult, so fishmeal has finally been banished for all ruminant species since 1st January, 2001. The province of Antwerp versus the northern part of Belgium is a potential risk for fishmeal traces and MBM traces. The northern part of Belgium versus the whole Belgium presents the same situation. The fabrication process of ruminant feed must be separated of non-ruminant's feed process, to avoid a cross contamination with fishmeal.

The investigation of all these potential risks by a multivariate analysis will provide information about the real risk of contamination of cattle in Belgium in the future. The data collected bring some information about the feed production companies. The perimeter of distribution of suspected feed production companies could be obtained if the compilation is made with the place of sampling. Future aims could be to find the causal relationship between feed production companies and cases of BSE notified during 2001-2004, and to find real risk factors concerning MBM in Belgium. Other countries, especially France, have realized the same study about dicalcique phosphate and milk for calves [6]. It would be interesting to realize the same study with Belgian data.

## REFERENCES

- [1] Wilesmith J.W., Wells G.A.H., Cranwell M.P., Ryan J.B.M. Bovine spongiform encephalopathy : epidemiological studies. *Vet. Rec.*, 1988, 123, 638-644. [2] Anonyme. Décision 2000/766/CE du conseil du 4 décembre 2000 relative à certaines mesures de protection à l'égard des encéphalopathies spongiformes transmissibles et à l'utilisation des protéines animales dans l'alimentation des animaux. *J. Off. Eur. Communautés*, 2000, L 306, 32-33. [3] Anonyme. Directive 2003/126/CE de la commission du 23 décembre 2003 relative à la méthode d'analyse applicable en matière d'identification des constituants d'origine animale pour le contrôle officiel des aliments pour animaux. *J. Off. Eur. Communautés*, 2003, L 339, 78-84. [4] Grenier B. Utilisation des Odds dans les tests associés ou séquentiels. In, *Décision médicale: analyse et stratégie de la décision dans la pratique médicale*. Edition Masson : Paris, France, 1990, 102-106. [5] Gizzy G., Van Raamsdonk L., Baeten V., Murray L., Berben G., Brambilla G., Von Holst C. An overview of tests for animal tissues in feeds applied in response to public health concerns regarding bovine spongiform encephalopathy. *Rev. Sci. Tech.*, 2003, 22, 311-331. [6] Paul M., Abrial D., Jarrige N., Rican S., Garrido M., Calavas D., Ducrot C. Bovine spongiform encephalopathy and spatial analysis of the feed industry. *Emerg. Inf. Dis.*, 2007, 13 (6), 867-872.

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