Speciation of mammalian MBM particles with NIRM and Real Time PCR analysis

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The total ban on meat and bone meal in feedingsuffs is the most important measure against the spread of the BSE. The Regulation (EC) N° 1774/2002 lays down health rules concerning animal by-products not intended for human consumption. The main principles described in this text are : no MBM whatever its origin in ruminant feed, no MBM from ruminant origin in any feed and no cannibalism. At present, classical microscopy remains the only official method to detect MBM in compound feeds. The method is, however, restricted to discriminate higher taxonomic groups such as terrestrial animal or fish and is largely dependent of the presence of bones. So, there is a crucial need of new reliable methods able to determine the species origin of MBM particles.

The potential of near-infrared microscopy (NIRM) for the detection of meat and bone meals in feed was demonstrated. Nevertheless, an important challenge is the discrimination between mammalian species such as cattle and pig. Pure species animal meals (cattle and pig MBM) provided by the European Fats Processors and Rendering Association (EFPRA) were analysed by Real Time PCR to check the absence of any contamination. NIR microscope spectra of the particles were then acquired to develop species specific spectral libraries. As the NIRM methodology is a non destructive analysis, the species origin of each particle was controled again by Real Time PCR according an original protocol. Discriminant models able to classify the particles according to their species origin were built by testing different chemometric classification methods (PLS, ANN, SVM).

The results show that NIRM has a promising potential to discriminate cattle from pig particles. Further works are in progress to identify also particles of sheep and chicken origin. Coupled in an original strategy, NIRM and Real Time PCR are two complementary techniques. NIRM can make the distinction between forbidden animal particles (e.a. meat, bones) and authorised ones (e.a. milk powder, blood). Real Time PCR can confirm the prediction of NIRM and help to build spectral libraries with authenticated particle spectras.