P.34.- In-house validation of NIRS chemometric models to test the presence of animal origin meals in unground compound feedingstuffs.

D. Pérez-Marín[1], A. Garrido-Varo[1], J. E. Guerrero[1], B. de la Roza[2]

[1]Faculty of Agriculture and Forestry Engineering. ETSIAM.University of Córdoba. Apdo. 3048. 14080. Córdoba (Spain) (pa1gavaa@uco.es/pa2pemad@uco.es)
[2]Servicio Regional de Investigación y Desarrollo Agrario (SERIDA). Apdo. 13. 33300 Villaviciosa, Asturias (Spain)

The ban of the use of animal origin meals in compound feeds is one of the measures carried out in the EU to stop the spread of the Bovine Spongiform Encephalophathy (BSE) and to prevent its re-occurrence. It is now clear that the ban will be only lifted if there are available analytical methods that ensure its enforcement.

NIR spectroscopy is likely to be the most rapid method of testing feedingstuffs, allowing a substantial increase of the number of controlled samples and providing an instantaneous response to detect adulterated samples. However, the traditional application of NIRS involves grinding of samples. That sample preparation is some times one of the most critical steps in the implementation of NIRS technology.

The goals of the present work is to show the feasibility of NIRS predictive models for detecting and quantifying the presence of animal origin meals in compound feedingstuffs analysed unground and, moreover, to demonstrate the ability for transferring the calibration models between two instruments. For the purpose of this research, two complementary chemometric strategies were evaluated. First, the use of a qualitative discriminant PLS equation (n= 523; SECV=0.19; r^2=0.86), which uses dummy variables with values 1 (free) or 2 (with), to determine whether a compound feedingstuff has been contaminated or not with meat meal. Second, a quantitative PLS calibration equation for the prediction of the inclusion percentage of meat meals in compound feedingstuffs (n= 523; SECV= 0.80%; r^2=0.98).

An in-house validation of these two models was carried out with a blind test set of 18 compound feedingstuffs (10 free and 8 contaminated with meat meals) produced during 2003 and being representative of those produced after the publication of the total ban. This validation set was scanned using the natural cup, in two cloned NIR instruments equipped with transport module. The results show that the qualitative model gave 100% classification rate for the blind samples analysed in both, the master and the host instruments. For the quantitative prediction of meat meal percentage, the results obtained in both matching instruments are quite similar; all the samples contaminated and seven samples free are well predicted, resulting the other three as false positive samples. The origin of that mis-classification may be found when considering the composition of the three samples on other animal by-products (i.e. animal fats).

The results demonstrate that NIR can be used as a screening method to accomplish the fulfilment of regulations concerning the production of compound feedingstuffs. NIRS must therefore be considered an indispensable tool and an integral part of Food Safety programs.

Keywords

Compound feedingstuffs, NIR, animal origin meal, unground analysis.