P.36.- The use of NIR spectral signature to differentiate among categories of inedible fats and oils.

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The EU Regulation EC Nº 1774/2002 governing Animal Processed By-Products (ABPs) addressed the possible risk inherent in recycling potential BSE infectivity due to the absence of barrier within species and claimed to exclude the cannibalism, which may be induced by the intra-species recycling. This Regulation opened discussions about a possible ban of ruminant fats in feedinsgtuffs and about the importance of differentiate among categories of animal fats and oils. Therefore, it is urgent to have methods analytical with can help to enforce legislation concerning the traceability of animal and vegetable fats and oils. The Near Infrared Spectra of fats and oils seems to be an affordable spectral signature for identification fats and oils, however a pre-requisite for its implementation in practice is to have well authenticated samples to be used as NIRS spectral libraries and chemometric models from which the spectra of unknown samples may be identified. In the framework of a PhD thesis which is being undertaken at the University of Córdoba and funded by a national R & D project, a sample bank of 473 fat and oil samples have been created, in collaboration with several Spanish rendering plants and vegetable fat producers.

The objective of the present work is to show preliminary results of the use of NIRS library files for identification of unknown animal and vegetable fats and oils. A set of 40 authenticated rendered fats (training set) identified by the providers as being from pure poultry (n= 16), pure pork (n = 5) and mixture of ruminants and non-ruminants (n = 19) were scanned in a FOSS NIRSystems 6500 from October 2002 to October 2003. Latter on, from January to April 2004 , 20 unknown samples of fats and oils were also scanned (N = 8 animal fats, N = 2 soybean oils and 5 vegetable oleins and N = 5 fish oils). Principal component analysis of the training set reduced the multivariate spectral space into 10 new coordinates. Once, the unknown samples were projected into that new coordinate space, the Mahalanobis Distances (H) of each unknown sample from the center of the training set were calculated. The H distances ranged from 1 to 4 for the 8 animal fats, 11 to 20 for the 7 oils and oleins and from 21 to 34 for the 5 fish oils.

The preliminary results open great expectations for the use of the NIRS spectral data for classification of fats and oils according its origin. The success of a traceability system for animal fats and oils based on NIRS technology, is clearly dependent of the collaboration of fats and oils producers in the building of well authenticated spectral library files.

Keywords

NIR spectroscopy, animal fat, fish, vegetable, robust calibration, traceability