L.15.- Review of the possibilities offered by the near infrared microscope (NIRM) and near infrared camera (NIR Camera) for the detection of MBM

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Recent technological developments have lead to instrument combinations coupling for instance a near infrared spectrometer to a microscope (NIRM), and instruments based on the use of the near infrared camera technology (IR camera). With these instruments, spectra of up to hundred or thousand particles can be obtained from the analysis of one feed ingredient or one compound feed[1]. In the NIRM instrument, thank to the help of a dedicated microscope the infrared beam is focused on each particle of a sample spread on a sample holder and the near-infrared spectrum is collected. The result of the sample analysis is a successive collection of hundreds of spectra, each one being the molecular near infrared signature of a particle from one of the feed ingredients used in the formulation of the compound feed. The spectral features measured in the near-infrared region (1100 – 2500 nm) of the electromagnetic spectrum can be used to identify and to quantify the used ingredients. With a near-infrared camera (also called near-infrared imaging system) pictures of a pre-defined sample area are taken sequentially at different wavelengths are collected. This technique allows the analysis of about 500 particles in 5 minutes.[2]

Already gathered results show the high potential of near-infrared microscopy and infrared camera for the detection of meat and bone meal in feedingstuffs with analyses either on the raw material or on the sediment fraction. In the framework of STRATFEED[3] and Belgian RCS[4] projects different studies have been conducted: (i) comparison with classical microscopy and alternative methods (NIRS, PCR, ELISA), (ii) transfer of the method, (iii) discrimination between particles from different sources (e.g. fish versus terrestrial material), (iv) repeatability study. Moreover, a strategy based on the combination of the infrared microscopic methods (NIRM & IR camera) and polymerase chain reaction method (PCR)[5] has been proposed as an elegant solution for the control of the presence of animal products and the identification of their origin at species level.

Keywords :

Spectroscopy, microscopy, NIRM, Camera IR, PCR, hyphenated techniques MBM, fish meal.

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