Assessment of the Discrimination of Animal Fat by Raman Spectroscopy

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In recent years, there has been an increased attention towards the composition of feeding fats. In the aftermath of the BSE crisis all animal by-products used in animal nutrition have been subjected to close scrutiny. Regulation requires that the material belongs to the category of animal by-products fit for human consumption. This implies the use of reliable techniques in order to insure the safety of products. The need of rapid and reliable techniques for the quality control and the assessment of food and feed composition has allowed to an increase use of vibrational spectroscopic approaches, because of their rapidity and high ability to give molecular structural information. Raman spectrometry method is fast and does not require any sample preparation steps prior to analysis.

Feeding fats of different categories (acid oils from chemical or physical refining, lecithins, recycled cooking oils, hydrogenated fats from by-products fats, oils extracted from exhausted bleaching earth, fish oils, and animal fats) were analyzed by Raman spectroscopy.

Data were treated using Partial Least Square – Discriminant analysis PLS-DA which has permitted to discriminate terrestrial animal fats from the other categories and types of feeding fats like fish oils, and vegetable fats formed by physical or chemical refining. PLS-DA model presents sensitivity and specificity of 0.958 and 0.914, respectively. In addition, Support Vector Machine SVM will be applied in order to assess an improvement of discrimination of animal fats.

Results make it possible to consider this analytical methodology as a preliminary study for the development of a rapid and reliable way for the discrimination of animal fats used in feeding stuffs.