

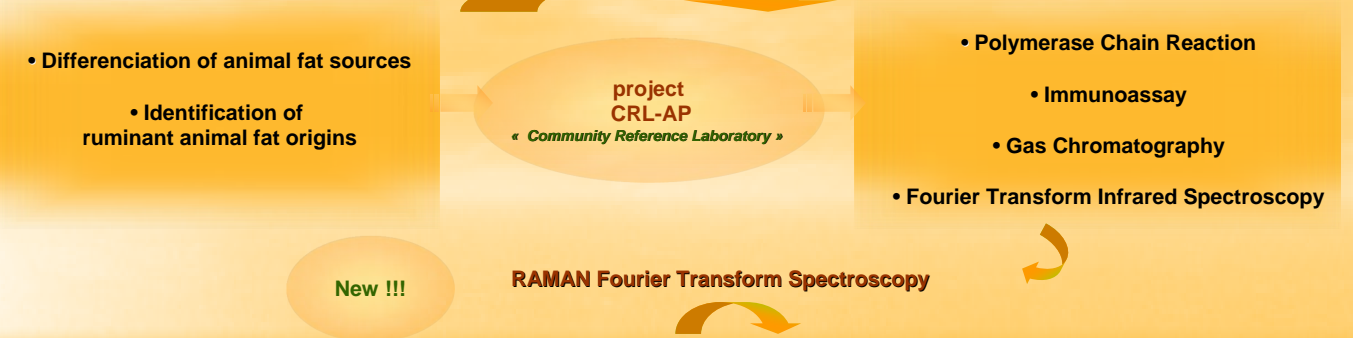
# Animal fat discrimination by FT-Raman Spectroscopy

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## Introduction

Animal fat is very important animal by-product used as a feed ingredient. Since the appearance of Bovine Spongiform Encephalopathy (ESB) in the eighties [1], the ingredients of feedstuff are continuously analyzed to evaluate the ESB risk[2]. This one is due to the fact that animal fats contain protein residues. Therefore, the majority of European Union Member States have regulated the use of the animal by-products in the animal feeds. Criteria for the safe use of ruminant fat in animal nutrition in Europe are defined by Regulation 1774 / 2002 [3] which requires that the material belongs to category of the animal by-products fit for human consumption and the maximum concentration of residual insoluble impurities (mainly consisting of protein) after purification does not exceed 0.15%.

[1] EC (1998) Bovine spongiform encephalopathy (BSE), 3rd edn. Vademecum, 16 October 1998. European Community, Brussels.  
 [2] Bellorini S., Strathmann S., Baeten V., Fumière O., Berben G., Tirendi S., von Holst C., (2005) Anal. Bioanal. Chem., 382, 1073-1083.  
 [3] EC (2002) Regulation (EC) No 1774/2002 of the European Parliament and of the Council laying down health rules concerning animal by-products not intended for human consumption. Off. J. Europ. Commun., L273:1-95.



**Objective** Test and evaluation of FT-RAMAN spectroscopy suitability for the discrimination of various animal fat origins

## Experimental conditions

Analyzed samples: 6 types of liquid and solid animal fats and 6 fat mixtures  
 Poultry, Tallow, Lamb tallow, Lard fats, Fish oil and Mixtures

\*Spectra region: 3500-700 cm<sup>-1</sup> \*Number of scans: 128 \*Spectral resolution: 4 cm<sup>-1</sup>

Raman spectra of studied fats

**Data treatment** Pre-processing Principal Component Analysis (PCA) Multiplicative Scatter Correction (MSC), Baseline Correction, Mean normalization **Chemometric treatment**

## Results

**Calibration samples into three groups: Poultry, Tallow, Lard**

Projected **test samples** are distributed as follow:

- o Lamb and mixtures coded 1, 3, 4, and 8 join the calibration samples
- o Mixtures coded 2, 5 and 7 are discriminated from the calibration samples
- o Fish samples form their own group

Residuals show the Distinction of new samples from those of the calibration set

Hotellings show the Distinction of new samples from those of the calibration set

## Conclusion and prospects

This preliminary study has shown the potential of Raman spectroscopy to discriminate the various types of animal fats.

## Acknowledgement

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