Vibrational spectroscopy for the authentication and traceability of food products: contributions to European projects

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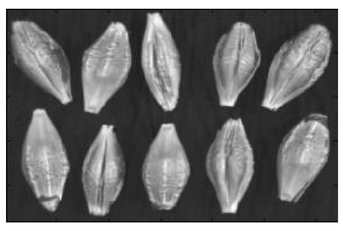
Various labels preserve quality food products coming from particular geographical areas and protect consumers against imitations and false information. Traceability is an essential tool to enhance trader and consumer confidence in the safety, quality and authenticity of the food. It also helps the regulatory authorities to detect fraud and dangerous substances. Traceability with regard to authenticity issues can be interpreted as verifying the labels, tracing the origin of food or confirming the presence of ingredients claimed to be in that food/feed. Vibrational spectroscopy (Near-infrared, mid-infrared and Raman) is increasingly considered as the preferred tool in the traceability and authentication of food products. Methods are rapid, simple-to-use, non-destructive, environment friendly and can fit for on line analyses. This poster presents several results achieved during these last years in the framework of European projects dealing with authentication and traceability.

FOOD AND FEED PRODUCTS

Meat products


Olive oil


Alcoholic beverages


Seeds

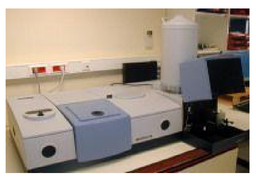

Feed ingredients


Cereals

SPECTROSCOPY

Near Infrared Spectroscopy

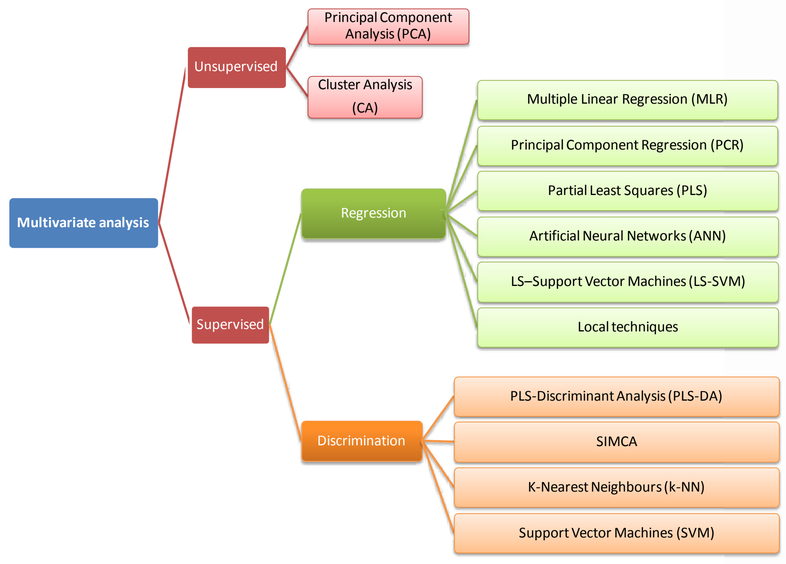
Mid Infrared and Raman



Near Infrared Microscopy

Near Infrared Imaging

CHEMOMETRICS



EUROPEAN PROJECTS

www.typic.org

Typical assessment of dry-cured hams by NIRS

www.huespedes.cica.es/aliens/igmedeo

Detection of olive oil adulterated with hazelnut oil by mid-IR and FT-Raman

www.trace.eu.org

Tracing the origin of Olive oil, honey, Trappist beers by NIRS and FT-Raman

www.coextra.eu

Discrimination between GMO and non GMO barley seeds by NIR imaging

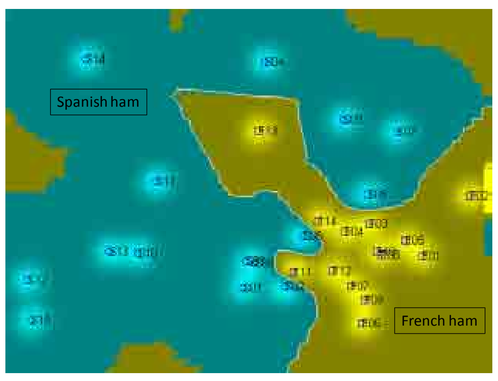
www.safeedpap.feedsafety.org

Authenticity of Feed ingredients by NIR imaging

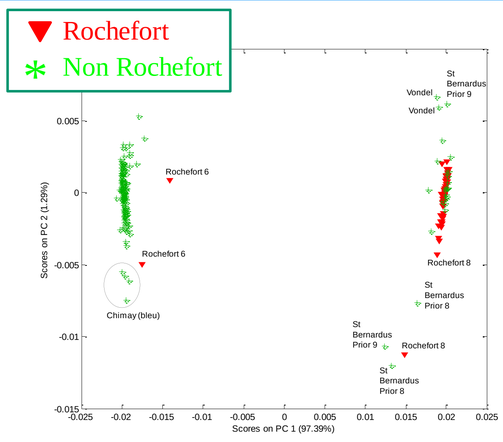
www.conffidence.eu

On-line detection of contaminants in cereals by NIR imaging

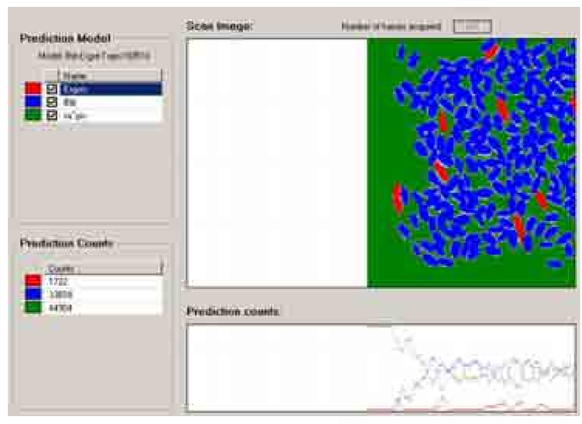
RESULTS



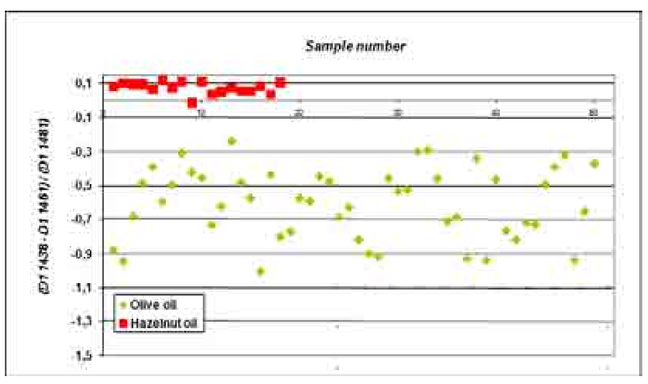
SVM model showing the discrimination between French and Spanish hams.



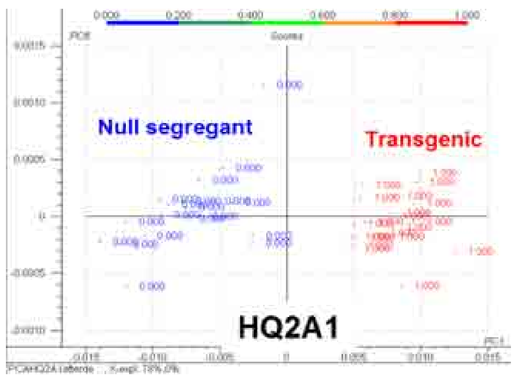
PCA results of FT-Raman spectra for the discrimination between Rochefort and non-Rochefort beers.



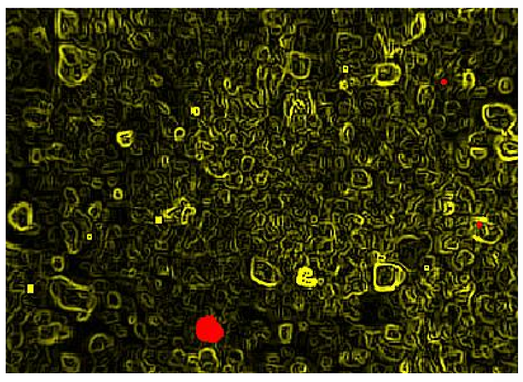
PLSDA model showing the detection of ergot (red) in wheat (blue)



Discrimination between olive oil (green) and hazelnut oil (red) based on absorbance ratio of Mid-IR spectra at 3 wavelengths



PCA results showing the differentiating according to the presence or not of transgenic material in barley .


SVM model showing the detection of processed animal proteins - PAP (red).

Reference: Vermeulen, P., Fernandez Pierna, J.A., Abbas, O., Dardenne, P. & Baeten, V. (2010). Authentication and traceability of agricultural and food products using vibrational spectroscopy. In: *Applications of Vibrational Spectroscopy in Food Science, Li-Chan, Eunice C.Y., Griffiths, Peter R. & Chalmers, John M. John Wiley & Sons, Ltd, 2, 609-630.*

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