**Aim**

Assessment of the use of portable fluorimeter in the reception line at the facility of a local canning industry

**Method**

RPA (Recombinase Polymerase Amplification)

**Outcomes**

The technology is suitable to discriminate between tuna species within 15 minutes (excluding DNA isolation) with an inexpensive, portable and easily usable equipment; it could be used at different locations of the supply chain.

**Prevents**

Substitution of yellowfin tuna with different species

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**Product**

Frozen yellowfin tuna

**Authors**

Miguel Angel Pardo

**Organisations**

- Food Research Division, AZTI, Parque Tecnológico de Bizkaia

Read the entire abstract: [www.foodintegrity.eu](http://www.foodintegrity.eu)
Visible-Near Infrared Spectroscopy (Vis-NIRS) application for the differentiation of fresh and frozen/thawed tuna

**Product**
Fresh and frozen/thawed tuna

**Aim**
Investigation of the ability of Vis-NIRS to discriminate between fresh and frozen/thawed tuna samples

**Method**
Vis-NIRS (Ultraviolet Visible Near Infrared Spectroscopy)

**Outcomes**
Method able to detect the difference between fresh and frozen/thawed tuna samples.

**Prevents**
Substitution of fresh tuna with frozen/thawed material

Read the entire abstract: [www.foodintegrity.eu](http://www.foodintegrity.eu)
Evaluation of LIBS as a high-throughput method for the determination of the geographical and agricultural origin of tomato samples.

The geographical origin and agricultural production method is reflected in the multi-elemental composition of tomatoes. Elemental fingerprinting obtained by either Q ICP-MS or LIBS have the potential to determine where a plant has been grown, when combined with chemometrics.

Prevents adulteration and mislabelling of tomato-based products.

Read the entire abstract: [www.foodintegrity.eu](http://www.foodintegrity.eu)
Aim

Development of a fast method for the at-line and on-line detection of common wheat grains in large samples of durum wheat lots

Method

NIR, PLS-DA (Near Infrared Spectroscopy, Partial Least Square Discriminant Analysis)

Outcomes

The study showed the potential of NIR hyperspectral imaging combined with chemometrics to propose solutions for sorting grains at the entrance of the production chain, according to the species (morphological and spectral profile), the protein content and the vitreousness.

Prevents

Adulteration of durum wheat by lower quality species (common wheat)

Read the entire abstract: www.foodintegrity.eu
Aim

Developing and validating a method to screen and confirm oregano adulteration

Method

FTIR, LC-HRMS (Fourier Transform Infrared Spectroscopy, Liquid Chromatography - High Resolution Mass Spectrometry)

Outcomes

The two tier system validated provides a cost effective and reliable testing method. It could be expanded to cover all herbs sold on the market.

Prevents

Adulteration of oregano with different herbs

Read the entire abstract: www.foodintegrity.eu
Detection of emulsifiers used as unlabelled ingredients in finished products (Pasta) through both direct (e.g. LC-MS/MS) and indirect (e.g. XRF, enzymatic kits, free fatty acids GC-FID ratio) strategies

Aim

Development of a method able to detect unlabelled emulsifiers in pasta

Method

LC-MS/MS, XRF, GC-FID (Liquid Chromatography - Tandem Mass Spectrometry, X-Ray Fluorescence), enzymatic kits

Outcomes

Analytical method for the detection of E481/82 emulsifiers. Thanks to the combined information collected by the smart application of different analytical techniques, the addition of unlabelled ingredients can be detected. The method could be applied to several steps of the production chain.

Prevents

Adulteration of pasta by exogenous materials (e.g. emulsifying agents)

Read the entire abstract: www.foodintegrity.eu
Quantification of beef and pork meat species in highly processed food: application on Bolognese sauce

**Organisations**
- Advanced Laboratory Research, Barilla SPA
- Siteia - Università di Parma

**Authors**
Francesca Lambertini, Andrea Leporati, Michele Suman, Barbara Prandi, Stefano Sforza

**Product**
Bolognese sauce
(Highly processed meat-based food matrices)

**Aim**
Detection and quantification of beef and pork meat species

**Method**
HPLC/ESI-MS/MS
(High Performance Liquid Chromatography / Electrospray Ionisation Tandem Mass Spectrometry)

**Outcomes**
The method, successfully developed and validated, could be implemented in food industries to check the meat composition of raw materials, intermediate and final products. It involves the use of relatively low cost instruments and does not require highly specialised technicians.

**Prevents**
Adulteration of meat based products by the introduction of undeclared species

Read the entire abstract: [www.foodintegrity.eu](http://www.foodintegrity.eu)
Aim
Detection of commercial enzymes in wheat based bakery products

Method
UHPLC/ESI-MS/MS (Ultra High Performance Liquid Chromatography / Electrospray Ionisation Tandem Mass Spectrometry)

Outcomes
The method is suitable to detect the addition of commercial enzymes used in bakery productions as technological adjuvants to soft wheat flour.

Prevents
Undeclared addition of exogenous enzymes to bakery products

Read the entire abstract: www.foodintegrity.eu
Aim

Identification of the cause of meat discolouration during packing processing.

Method

NMR, LC-HRMS (Nuclear Magnetic Resonance, Liquid Chromatography - High Resolution Mass Spectrometry)

Outcomes

The identification of protein metabolites and the observation of the processing methods adopted by the industry led to the conclusion that the heat from the processing facilities was inducing discolouration.

Prevents

Production of discoloured beef

Read the entire abstract: www.foodintegrity.eu
Detection of the fraudulent adulteration of vinegar and balsamic vinegar using Isotope Ratio Mass Spectrometry Analysis

**Aim**
Identification of adulterant substances into vinegar

**Method**
IRMS (Isotopic Ratio Mass Spectrometry)

**Outcomes**
The EU official methods currently used to detect the fraudulent addition of water and exogenous sugars to grape must and wine can also be applied to wine vinegar and ABM.

**Prevents**
Fraudulent adulteration of vinegar or ABM not in compliance with law and/or PDO protocol requirements

Read the entire abstract: [www.foodintegrity.eu](http://www.foodintegrity.eu)
Aim
Validation of the use of isotopic and elemental composition methods to detect the origin of cheeses used to prepare pre-packed products, when the usual check on the PDO logo on the rind is not possible

Method
IRMS (Isotopic Ratio Mass Spectrometry)

Outcomes
The approach proved to be suitable to verify PDO cheeses mislabelling. The performance data obtained were submitted to the Italian standardisation agency UNI (Italian Organisation for Standardisation) to obtain the official recognition of the method.

Prevents
Mislabelling of PDO dairy products

Read the entire abstract: www.foodintegrity.eu
**Aim**
Determination of characteristic variability ranges for stable isotope ratios in several fractions of Italian citrus juices and assessment of their compliance with those established by the European Fruit Juices Association.

**Outcomes**
AIJN thresholds are not always fully applicable to samples of Italian fruit juices. In light of the results obtained, a commentary note updated on the Italian data will be added to the AIJN Code of Practice.

**Prevents**
Addition of sugar/water to fruit juices; substitution of raw materials

Read the entire abstract: [www.foodintegrity.eu](http://www.foodintegrity.eu)
Detection of the fraudulent adulteration of Italian tomato *passata* using Isotope Ratio Mass Spectrometry analysis

**Aim**
Definition of a characteristic range of $\delta^{18}O$ values for the natural Italian tomato *passata* in order to establish a threshold limit that could eventually become official and be adopted to implement the Ministerial Decree (D.M. 23rd September 2005)

**Method**
IRMS, SNIF-NMR (Isotopic Ratio Mass Spectrometry, Site specific Natural Isotopic Fractionation - Nuclear Magnetic Resonance)

**Outcomes**
AIJN thresholds are not always fully applicable to samples of Italian tomato juices. In light of the results obtained, a commentary note updated with data on the authentic samples of tomato sauce ‘passata’ (Brix degree from 7.5 to 11.9) will be added to the AIJN Code of Practice. Moreover, the introduction of this kind of product in the AIJN guidelines has been asked.

**Prevents**
Addition of water; dilution of tomato *passata*

Read the entire abstract: [www.foodintegrity.eu](http://www.foodintegrity.eu)