Infrared spectroscopy (IR) is conventionally divided into three wavelength regions: the near-infrared (NIR: 700–2500 nm), mid-infrared (MIR: 2500–25,000 nm), and far-infrared (25–1000 μm) (Figure 1).

Near-Infrared Spectroscopy Technology

When the molecules are irradiated with NIR these absorb a part of the energy. The other part of radiation is reflected and a reflectance spectrum is obtained.

- Every sample has a specific reflectance spectrum (Figure 2).
- The reflectance spectrum depends on the sample composition.

Figure 2: Spectra of ethanol, methanol and toluene in the NIR region between 1900 and 2500 nm. Sun (2004).

NIRS Technology has the ability to provide information about the composition of a sample.

OBJECTIVE: To expose the advantages of the application of the NIRS technology to detect food fraud

Near-Infrared Spectroscopy and Food Fraud

DAIRY SECTOR
Adulteration of milk and infant formula with melamine in China (Figure 3).

OILS AND FATS SECTOR
Toxic oil syndrome in Spain.

MEAT SECTOR
Horsemeat scandal in Europe.

Advantages

Regarding the sample:
- MULTI PRODUCT
- NON-DESTRUCTIVE (Figure 4).

Related to the information that it provides:
- IT PROVIDES CHEMICAL, PHYSICAL AND SENSORY features
- IT IS MULTI-CONSTITUENT

Compared with other methods of analysis:
- NON-POLLUTING
- IT IS FAST
- IT IS CHEAP

Conclusions

- NIRS Technology allows to perform qualitative analysis in other to detect food fraud.
- NIRS advantages offer a competitive technique against traditional methods.

References