

NIRS TECHNOLOGY FOR IMPROVING QUALITY CONTROL, TRACEABILITY AND LABELLING IN FOOD PRODUCTS

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Food quality, safety and traceability are a primary concern for international policies, since are keys requirements to ensure consumer health and successful national and international trade.

The increase in complexity of the food chain requires its control as a whole, covering all the steps that make up it, i.e. from raw material production, to processing and distribution. In fact, the food chain is vulnerable to a range of food hazards that may arise at any stage of the chain, and new hazards and risks are continually emerging. Then, an integrated approach for control, inspection and monitoring of the food chain and efficient analytical methods, able to be implemented along the whole food chain, are essential tools in preventing or avoiding new food crises and frauds. In addition, the analytical needs for the food industry are linked not only to compliance with regulations, but also to the need to control their processes for increasing their competitiveness. Inaccurate or uninformative quality and safety assessment methodologies are detrimental to producers, processors and, ultimately, consumers of food products. Currently, food quality and safety are based on discontinuous at-line measurements and traditional analytical methods, while traceability systems are based on documentary tracking and effective labeling. As can be deduced, this is not enough to answer the described problematic of the food industry, nowadays more consumer-focused, which demands faster response times to deal with food scandals.

Therefore, it is clear the need for rapid and efficient analytical procedures to monitor and verify food quality, and to trace food efficiently from the origin to the consumption, including the labeling of the final product and requiring extensive sampling and non-destructive analysis of individual items. Near Infrared Spectroscopy (NIRS) have demonstrated to be ideally suited to this purpose, enabling rapid, non-destructive, accurate, and economical analysis of large volume of samples and environmentally safe assessment (not use chemical reagent and not produce waste chemical residues) of multiple parameters in a variety of products and processes. It must be highlighted that one of its main advantages is related with the big amount of product analysed when it works in continuous, reducing the sampling error and permitting the individual control. NIRS enables its use for general food control purposes at different points in the food chain. Most of the current applications are implemented at-line, but NIRS can be used, in-line, on-line, *in situ*, from farm to supermarket, in a large range of food products (oils, milk, meat, grains, fruits, processed food, etc.).

This lecture covers the current status and last advances in the technology for the analysis of food products, showing examples of relevant applications, focused on the used of portable devices and on-line developments.