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Poster Abstract – B.01

DEVELOPMENT OF ALTERNATIVE DETECTION METHODS FOR HIGH SENSITIVITY APPLICATIONS IN FOOD TRACEABILITY AND SAFETY

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Fluorescence has been the preferred choice for DNA labeling protocols in detection and quantification analysis. Traditionally, target DNA is detected after PCR or by Real-Time PCR using organic dyes which show several limitations such as weak photostability and a low emission per dye unit. These characteristics affect negatively sensitivity and detection limit of these analysis when quantity of target molecules is very low. Moreover, in food traceability applications, like GMOs and allergen detection, current systems are based on PCR amplification that are the most time consuming step in these type of analysis.

Electrochemical luminescence methods can provide significant advantages over fluorescence based methods such as no need of expensive laser sources for fluorophores excitation, no background noise due to the exciting light source and an higher sensitivity.

We are setting up a labeling method based on primer extension terminal labeling with ruthenium for ECL detection of nucleic acid hybridization. This will allow an highly sensitive detection of target DNA molecules in a complex matrix for applications in food traceability field such as detection of GMOs and allergens.

Nanoparticles have also gained a increasing interest in DNA and protein labeling as the doping of multiple labels on a single particle allow a sensitive amplification of signal (10^3-10^4 times) and serves as a protecting shell against photobleaching of labels. The use of ruthenium doped nanoparticles will allow an even higher increase in the sensitivity of the methods developed allowing the setup of PCR-free detection.

In this work we will compare traditional DNA detection methods with this new approaches in term of sensibility and applicability in GMOs analysis.