



UNIVERSITÀ  
DEGLI STUDI DI TRIESTE

# Atti del XXV Congresso della Divisione di Chimica Analitica della Società Chimica Italiana

*Trieste, 13 – 17 Settembre 2015*

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## **DEVELOPMENT OF AN ELECTROCHEMICAL IMMUNOSENSOR FOR THE IDENTIFICATION OF EGG TEMPERA**

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Analysis of the materials that constitute a piece of art is an important step not only for restoration, but also for conservation purposes. To this aim, the development of an electrochemical immunosensor based on gold nanoelectrodes ensembles (NEEs) is presented. In order to identify egg-tempera, which is one of the most common painting technique used since the Thirteenth<sup>th</sup> century, we focus the attention on the glycoprotein immunoglobulin IgY. IgY is present in egg-yolk at a concentration of 5-10 mg/mL and for this particular reason it represents a reliable marker to identify egg tempera from hen's egg yolk.

Gold nanoelectrodes ensembles are prepared by electroless deposition of gold using a track-etched polycarbonate (PC) membrane as a template [1]. The polycarbonate part is affine to proteins, so that it is possible to promote the immobilization of the biorecognition element on the PC insulating surface of the NEE [2]. Moreover, NEEs present geometrical and diffusion characteristics that permit to achieve a very low detection limit; this guarantees and preserves the typical high sensitivity of the immunoassays. For these reasons, NEEs are suitable to be used as transducers of electrochemical biosensors, in this particular case, an immunosensor. The analyte investigated is the antibody IgY, that is directly immobilized on the PC; the secondary antibody used is labeled with the enzyme horseradish peroxidase (HRP). In the presence of its substrate (hydrogen peroxide) and a redox mediator (methylene blue), HRP generates an electrocatalytic signal that is proportional to the analyte concentration [3].

In this work, we focus the attention on the improvement and optimization of the analytical procedure, in order to decrease the amount of sample, which, for artwork analysis, is a critical parameter.

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[2] S. Pozzi Mucelli, M. Zamuner, M. Tormen, G. Stanta, P. Ugo, *Biosensors and Bioelectronics* 23 (2008) 1900-1903;

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