Development of chemically modified screen printed carbon electrodes for caffeine and mouse IgG detection

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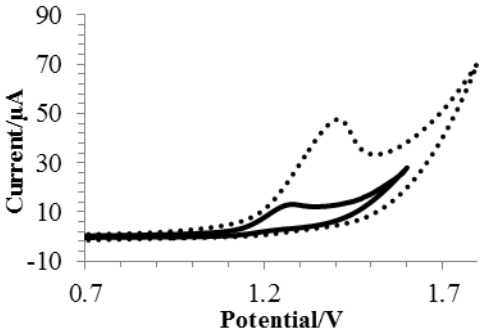

Fig.1. Electrochemical detection of caffeine: comparison of bare graphite electrode and nafion modified electrode (dotted line).

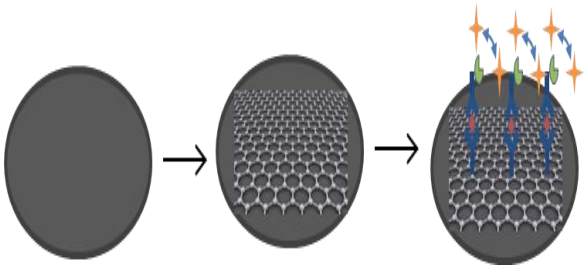

Fig.2. Scheme for the development of a graphene modified screen printed electrode for the detection as mouse IgG

Abstract:

The use of sensor technology in food analysis has gained a large amount of interest in recent years [1]. In this work, two different sensing strategies are outlined. Firstly, a chemical sensor for the detection of caffeine in real samples has been developed. As caffeine is an electrochemically active compound it can be detected directly using voltammetric methods. Graphene oxide, electrochemically reduced graphene oxide and nafion were then used to investigate the possibility of improving sensor sensitivity. It was found that the nafion modified electrode exhibited the best electroanalytical characteristics. These electrodes were then used in the development of an electrochemical immunosensor, using mouse IgG as a model analyte. This assay was then compared to the conventional ELISA technique and evaluated for use as a sensor for mycotoxin detection. Mycotoxins are secondary metabolites produced by a range of fungi and molds which have been linked to mutagenicity, teratogenicity and carcinogenicity in humans. Screen printed carbon electrodes have been used in this work because of their low cost which makes them a viable solution in industrial applications [2].

References:

1 McGrath, T.F.; Elliot, C.T. and Fodey, T.L.*Anal Bional Chem,* **2012**, 403, 75-92.
2 Ricci, F; Adonetto, G; Palleschi, G, *Anal Chim Acta*, **2012**, 605(2),111

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