**Extended Abstract**

**Alternative Methods for Antioxidants Determination †**

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Ellagic acid (EA) is a fused four-ring polyphenol found in numerous vegetables, fruits, seeds, and some nuts. Interest in EA has increased during the past few years due to its antioxidant, antiviral, antimutagenic, and anticarcinogenic effects [1]. Furthermore, EA has been marketed as a dietary supplement with a range of claimed benefits against cancer, heart disease, and other medical problems. Extracts from raspberry leaves or seeds, pomegranates, or other sources contain high levels of EA and are available as dietary supplements and juices. EA is known as a stable redox active system only in organic medium, but irreversibly oxidized with coupled chemical reactions showing ill-defined redox peaks in aqueous solutions. This work presents the electrochemical behavior of ellagic acid at the glassy carbon electrode (GCE) in different supporting media. The EA working solutions were obtained by successive dilutions with the corresponding supporting electrolyte of the daily prepared 10⁻³ M methanolic stock solution. Voltammetric recordings were carried out on an Autolab PGSTAT 12 electrochemical system (Metrohm Autolab B.V., Utrecht, The Netherlands) equipped with a three electrodes measurement cell (working electrode: GCE) and a PC running GPES 4.9 software.

Using cyclic voltammetry (CV), the electrochemical behavior of EA against three different working electrodes was studied: a platinum electrode, a gold electrode, and a GCE. The best signal was obtained with the GCE, when an oxidation peak characteristic of the EA was observed, which begins to separate into two distinct peaks as the scan rate increases. The influence of the nature and pH of the supporting electrolyte emphasized that the highest DPV signal of EA was obtained in acidic medium. The dependence of the potential at which the oxidation peak appears as a function of the scan rate was linear, indicating that the reaction from the surface of the indicator electrode is carried out by the exchange of an equal number of electrons and protons. The influence of the scan speed applied to the indicator electrode was studied by cyclic voltammetry in the 25–150 mV/s range. The graphical representations show a linear dependence of the anodic current on the radical from the scan speed, which means that the electrochemical process from the electrode surface is controlled by diffusion.

In order to verify the stability of the electrochemical response of the EA, six consecutive voltammograms were recorded, under different experimental conditions. The difference in intensity between the first scan and the next five is very large, indicating the adsorption of EA on the electrode surface. In this sign, a solution of EA in sodium hydroxide was prepared, and the behavior of the analyte was investigated with respect to an HB pencil graphite electrode (PGE). The results obtained did not differ from those for which the ellagic acid was dissolved in alcohol.

The performed studies on EA electrochemical behavior are promising for the development and application of a voltammetric method for the antioxidant determination of pharmaceutical products.
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References


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