ELECTROCHEMICAL GENERATION OF HYDROXYL RADICALS FOR PROTEIN OXIDATION STUDIES

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In the last decades, different studies shown that the increase in oxidative stress is associated with the risk factors implicated in the pathophysiology of many chronic diseases. Therefore it is important to evaluate the role that hydroxyl radicals-mediated damage may play in major human disorders. Proteins are important targets as they compose ca. 70% of cells. To understand the impact of specific modifications on protein function, stability and toxicity resulting of the damage caused by the attacked of these radicals it is important to characterize the proteins oxidation products obtained from assays where hydroxyl radicals are generated by clean processes [1]. In spite of radiolysis and photolysis are adequate for this purpose they are not accessible for most laboratories. On the other hand, Fenton-like reactions are quite accessible but have many drawbacks associated to the use of chemical precursors that can bias results [2]. In this context the electrochemical generation of hydroxyl radical can provide an alternative method that is both clean and accessible, were these radicals are formed as intermediate in the oxidation of water to produce oxygen. This reaction can be accomplished in different electrode materials such as of boron doped diamond electrodes (BDD) and platinum (Pt), among others [3].
In this work we present a study were the oxidation of BSA is conducted in different experimental conditions, including the anode material (BDD and Pt), current density and electrolytes. The extension of BSA oxidation was monitored by the quantification of carbonyl groups formed during the protein oxidation and the cleavage extension, evaluated by gel electrophoresis method (SDS-PAGE).

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